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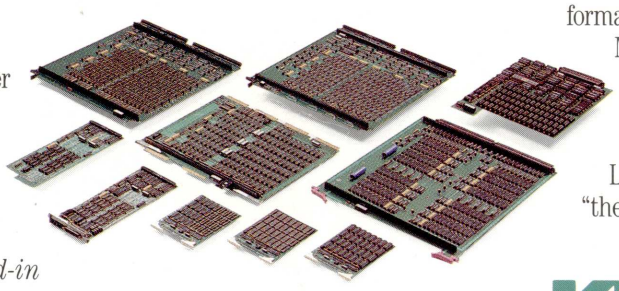
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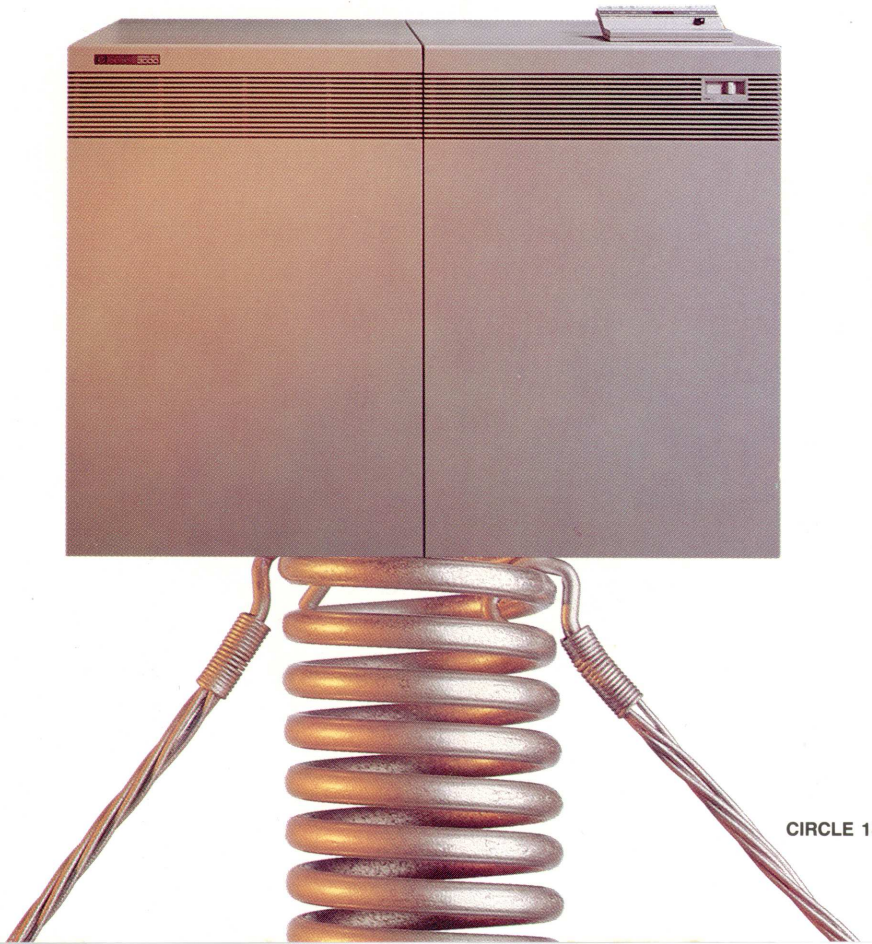
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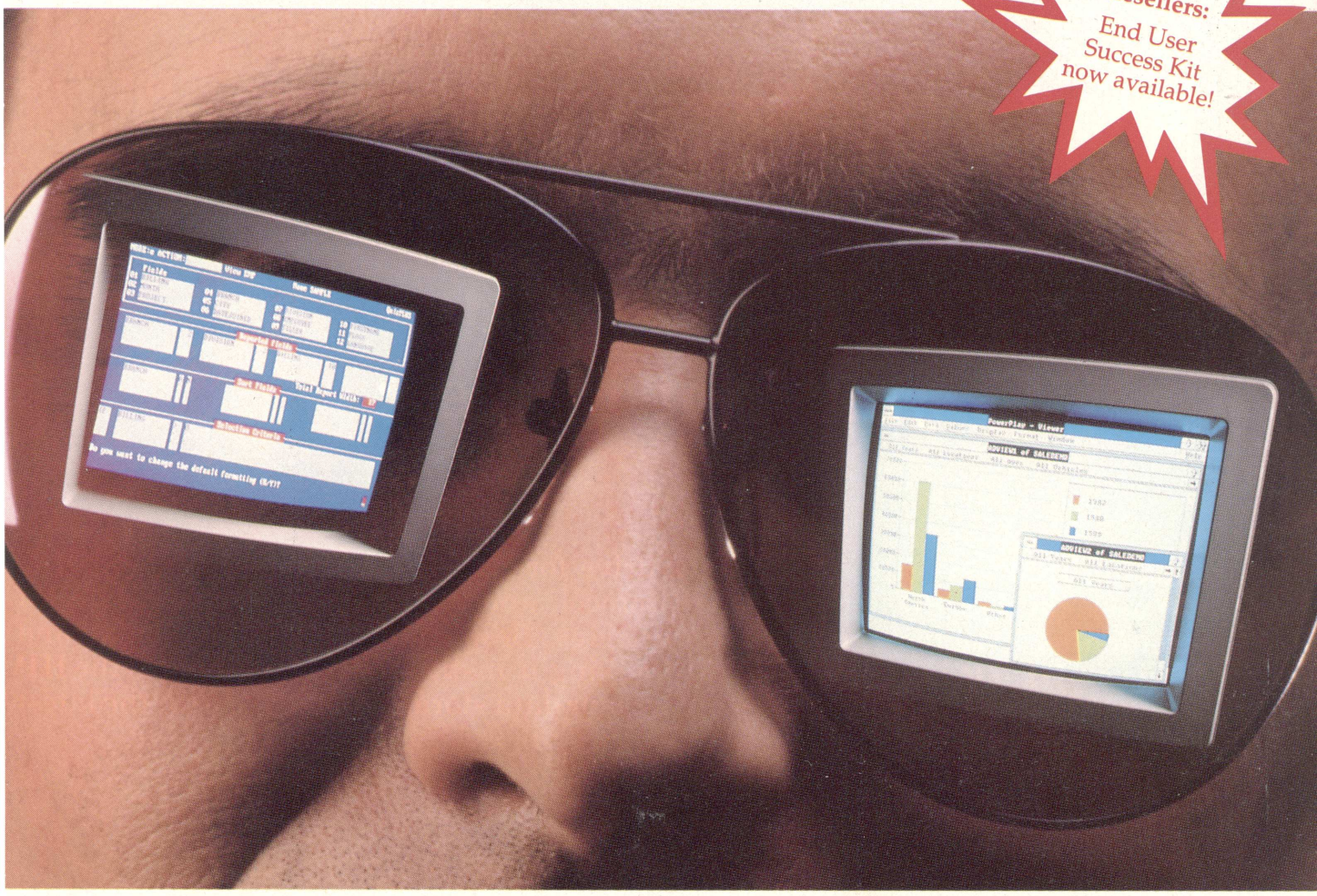
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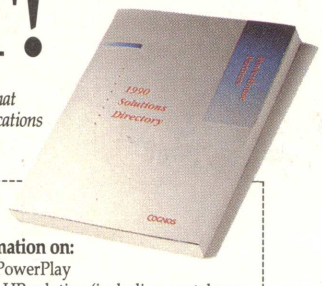
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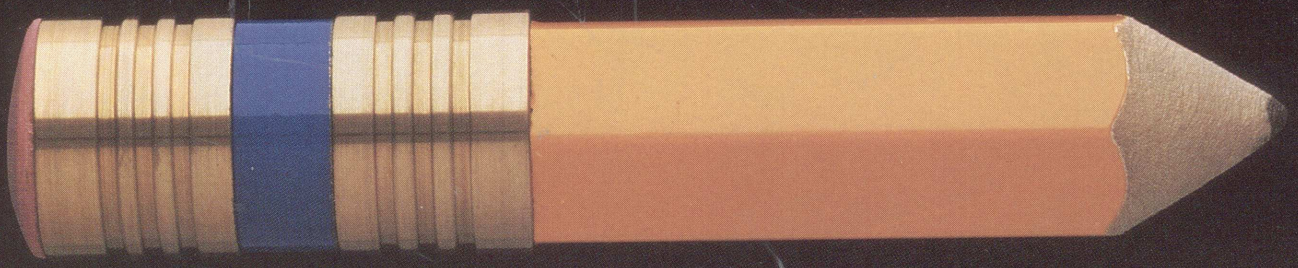
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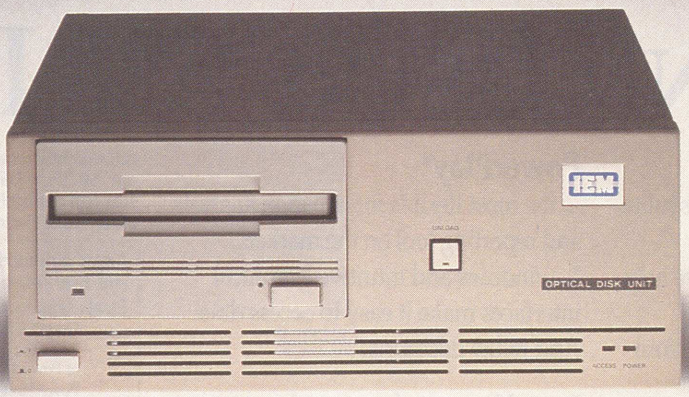
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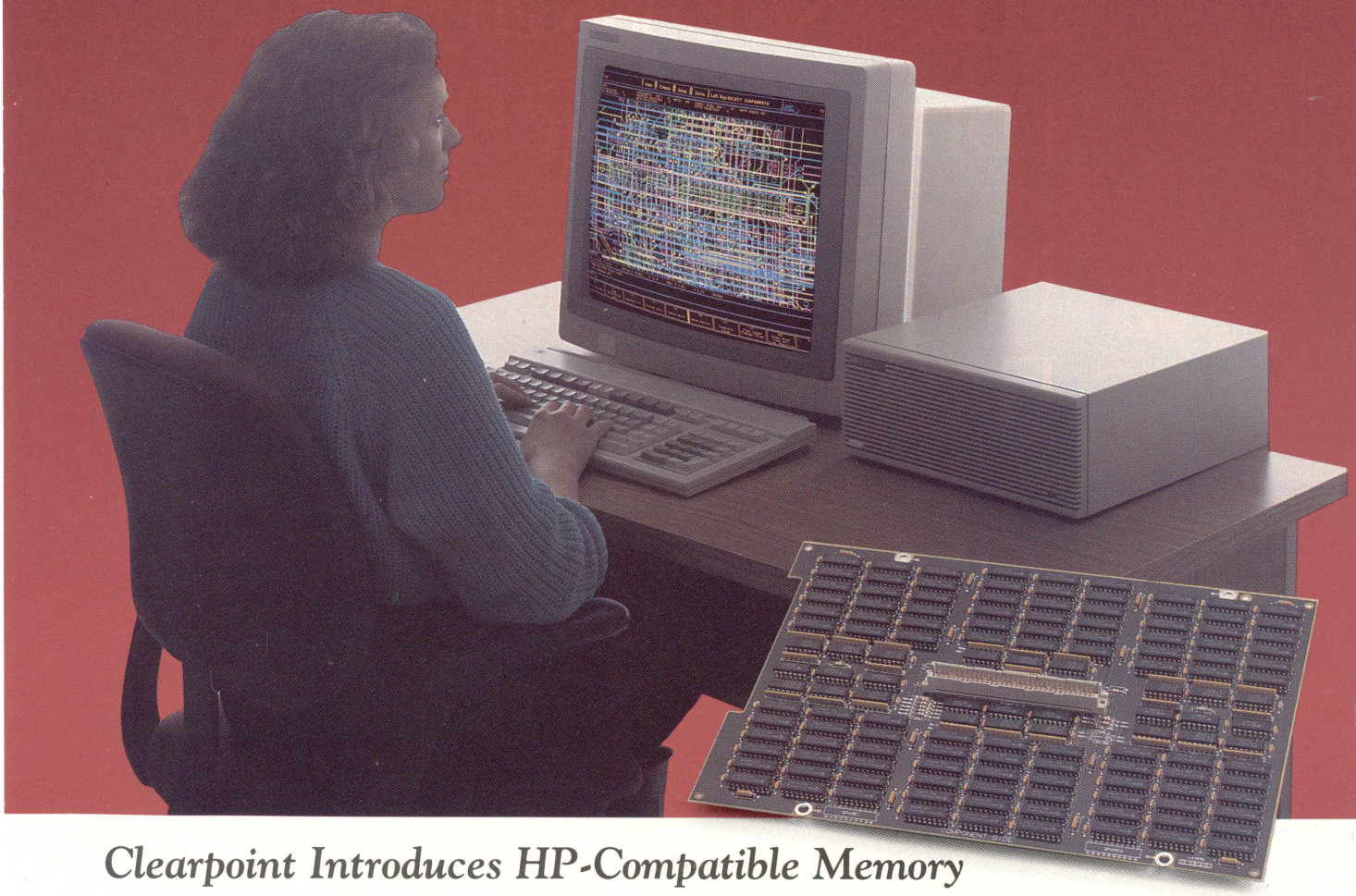
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Educating The Next Generation

When I write about the next generation, I'm usually referring to the next wave of computer systems. But this month, I'm referring to our children, who will follow us into the world of computing. Like some educators, I worry about what they'll bring with them from their school days.

Recently, when I visited several secondary schools, each one wanted to show off its computer department. I haven't been impressed. I have written before how the *New York Times*, the *Wall Street Journal* and others believe that PCs will take over the minicomputer market as soon as those PCs become powerful enough. They think PC networks will take over everything except the mainframe world — until we have 500 mips on our desks for $999, at which time they'll replace everything. Baloney!

Midrange computers *are* networks from the ground up, designed for multiuser use and file serving. PC networks link PCs and allow them to share resources and data, but they don't come close to the performance necessary to serve hundreds of users doing the work most of us expect and get from our systems.

Schools seem to have bought into the popular scene. When I visit them, I see Macs, IBM PCs and compatibles, and not much else. RSTS, the first real timesharing system on a minicomputer, began with a four-user educational system. Why don't we see more *real* machines doing *real* computing in our schools? Students learn word processing, spreadsheets and graphics — that's considered computing. What happened to FORTRAN, COBOL, BASIC or C? We're training end users, ignoring the people who make the computer do useful tasks.

Programming is a useful discipline beyond the coding of instructions for a computer. A step-by-step, exact solution to a problem is well understood if you've written a computer program. The rigors imposed by specifying exactly what you want done, leaving nothing out, aren't experienced anywhere as clearly as they are in writing a computer program. We aren't used to specifying things exactly or thinking logically about solutions.

Some argue that programming should be taught in college. But children interested in computers shouldn't have to wait until they get to a university to learn about them. How computers work and how to program them should be taught early. The curriculum should be expanded to keep tomorrow's talented computer people in school and motivated.

To find a solution, you must understand the problem. First, there's a lack of training for teachers. Some years ago, a local school district sought to purchase a "programmable calculator." I suggested a computer that could be used to teach programming and other things. The school superintendent summed it up: "The math teacher knows about the calculator. He doesn't know anything about the computer. Why should we buy him what he doesn't want?" Good point. If we want to improve computer training, we must start with the teachers.

Second, school boards think that PCs are the wave of the future. If you have PCs and Macs in your computer department, you're on the leading edge of technology. We must convince the teachers and the school board that real computing can exist in their school. It can even co-exist with PCs and Macs.

There's a part for all of us to play if we want to improve how we teach our children about computers. Computer vendors can start with an aggressive discount plan for schools. A high school I recently worked with got a discount, but it wasn't large, and the vendor seemed to treat it like just another commercial sale.

Software companies should offer similar large discounts. If you grow up with Lotus, what spreadsheet will you buy when you enter the business world? Furthermore, training companies should offer summer courses for teachers at reduced rates.

We all should get involved by asking our local school districts what they teach about computers and how they teach it. Maybe they need volunteers for after-school clubs. Possibly we could make some of our computer time available for teachers and students to let them find out what kind of computing we do. Tour your schools, attend school board meetings and get involved.

I used to think that the next generation would take my place with insight gained from exposure to computers since their early school years. But I'm not sure that the insights and experiences they get are preparing them to move us into the next computer generation, whatever that will be. There are more PCs than ever, but the old adage "Some's good, more's better" doesn't hold true here. PCs are only a part of the computing solution, and I want our successors to see the whole picture.





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INDUSTRY WATCH

Peggy King

HP Will Begin To Use Dealers To Sell Networking Products

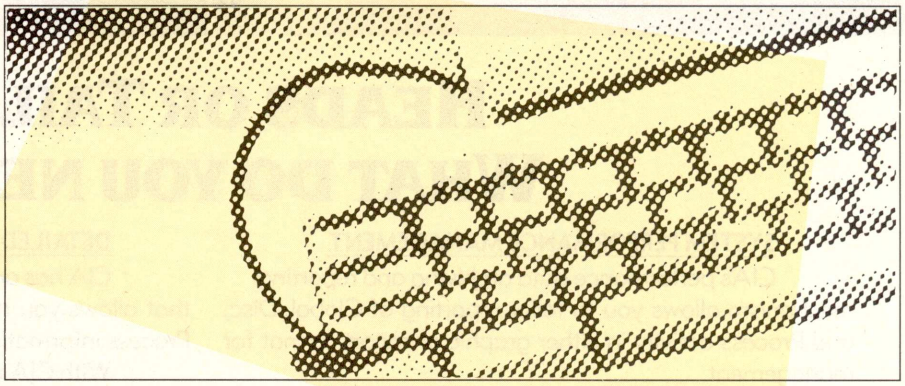
Coming Soon To A Dealer Near You

There's probably a PC dealership in your area where you can buy LaserJets, ThinkJets, VECTRA PCs and maybe even some of HP's PC software. And, if you have a local area network (LAN) that uses unshielded pair (ordinary phone line) cabling, you soon may be able to buy LAN hardware at that same store, especially if the dealer is a 3Com authorized or Novell Gold dealership. Through market research, HP has learned that many business customers prefer to buy networking products through resellers, dealerships and direct mail businesses.

HP ruled out the possibility of having its products sold at discount chains or mail order houses because the profit margins are extremely low and these channels don't offer customer support. As Lew Platt, executive vice president and head of HP's Computer Products Sector phrased it, HP will begin to sell networking products through "qualified" dealerships. Although the profit margins are lower for products sold in dealer channels than for those sold by the direct sales force, the cost of sales is also much lower. The marketing group at HP's Roseville Networks Division estimates that the cost of sales is as much as five times more for direct sales than it is for dealer sales.

HP's EtherTwist product line, a family of PC LAN hardware products designed for unshielded twisted pair cabling, will be the company's first networking products sold through dealer channels. The differences between the EtherTwist products and the StarLAN 10 products that proceeded them result as much from the changes in distribution channels as from advances in technology. For about two years, HP's direct sales force has been selling StarLAN 10 products as the networking segment of an all-HP solution. EtherTwist networking hardware was specifically designed to be sold by dealers to customers who already may have a multivendor assortment of PCs and networking products.

Both product lines offer all the hardware other than the cable that you need for a LAN — a hub for twisted pair ports, a modular adapter card (called a PC Link in HP lingo) for PCs with AT backplanes, and a transceiver (HP uses the term MAU, medium attachment unit). The EtherTwist line also includes an adapter card for PCs with a MicroChannel backplane and EtherTwist Hub Plus, a hub that is managed with HP OpenView Hub Manager software. (For more information on EtherTwist products, see the News and Trends section.)

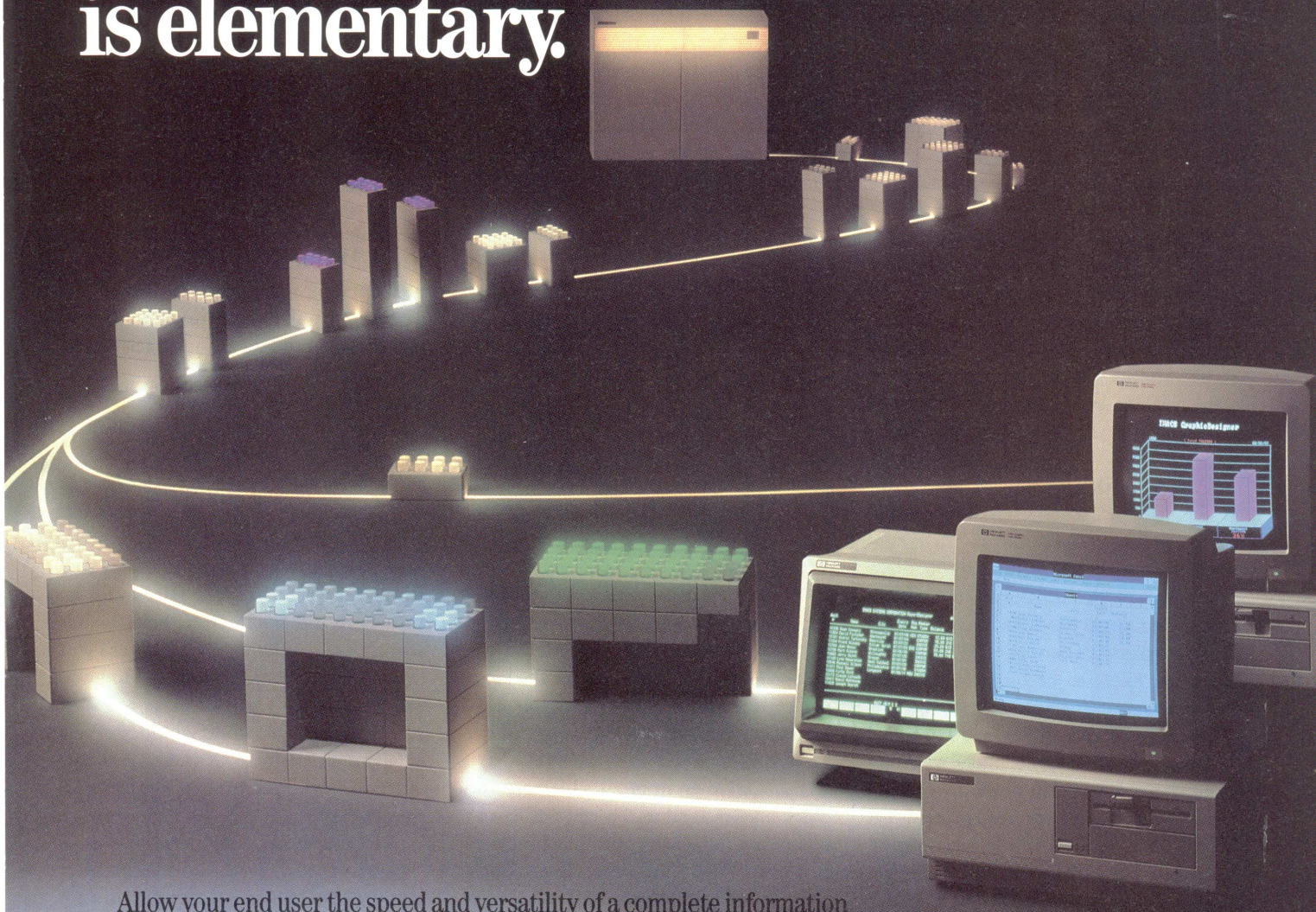


StarLAN 10 was introduced in 1988 before there was a standards body for twisted pair PC LANs. In March 1989 the 10Base-T committee, chaired by Patricia Thaler of HP's Roseville Networks Division, proposed extensions to IEEE 802.3 (Ethernet) standards. Although the IEEE 802.3 committee has not yet given final approval to the 10Base-T proposals, HP designed its EtherTwist products to comply with the emerging standard. The only requirement of 10Base-T that affects the interoperability of EtherTwist and StarLAN 10 is the link integrity beat or pulse that allows a transceiver to determine whether or not a transmission has been interrupted. The EtherTwist products have a switch to turn off the link integrity beat so that adapter cards and transceivers are backward-compatible with StarLAN 10.

EtherTwist's documentation set has a new look and feel that makes it better suited for the new distribution channels. The StarLAN 10 products come with very detailed documentation, all that a customer would want to know and more. EtherTwist documentation has been streamlined. Customers who just want to get the job done fast can use the quick references cards that will be included with each product. Each product has its own installation guide, and customers who purchase a hub also get a Network Startup Guide.

None of the EtherTwist products have the same size and shape as their StarLAN 10 predecessors. Thanks to surface mount technology (SMT), the printed circuit boards inside both the PC adapter card and the transceiver are smaller. The new transceiver is about the size of a credit card, costs nearly 40 percent less than the StarLAN 10 MAU and

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can save the customer even more because it can be connected directly to an AUI (attachment unit interface) without additional cabling. The hub was redesigned to fit in a standard 19-inch rack. That way customers can stack multiple hubs on one rack or have both hubs and standard-sized bridges stacked together.

The smaller packaging and industry-standard dimensions of Ethertwist products are two of the redesign efforts that show that HP is serious about selling in the dealer channel. Whereas StarLan 10 is an integrated solution designed exclusively for Vectra PCs, EtherTwist is a modular product line designed to be sold to customers who are "mixing and matching" HP products with parts from other vendors. EtherTwist products must plug and play in a multivendor environment in order to compete for shelf space at dealerships.

Along with the new distribution channels there are new types of customers — and new competitors. These customers are more attuned to competitive pricing than the corporate customers who sign a single purchase order to equip an entire site with networked Vectra PCs. They are likely to be budget-conscious MIS managers, department managers or purchasing officers. If they are in private industry, they are more likely to come from departments and divisions of Fortune 1000 companies or from professional offices such as law offices, accounting firms and advertising agencies. In the public sector, HP expects that dealer channels will attract customers from state and local governments. In some states (California, for example) government agencies are required to purchase computer products from authorized dealers.

HP expects the dealers who carry EtherTwist products to have experience selling LANs, configuring LANs for customers and providing post-sale support.

Although the twisted pair networking products are not yet commodity priced like coaxial products are, dealers don't stand to make much money from low margin sales of networking hardware unless they can also offer high margin support services. One way that HP can help dealers make money through support is by selling them the HP Wire Test Instrument so that they can troubleshoot twisted-pair LAN cabling and verify its compliance to 10Base-T standards. This instrument works with twisted pair cabling and PC LAN hardware from any vendor. When it is first introduced, dealers will be able to buy the Wire Test Instrument but not be able to resell it.

In order to reduce the potential for channel conflict, HP plans a lead-passing program to boost support for dealer sales.

When HP's direct sales force competes for corporate accounts that want large PC LANs designed and installed, they go up against AT&T and IBM. In the retail market for unshielded twisted pair LAN hardware, HP will compete with lesser known companies such as SynOptics, Tiara, David Systems, Cabletron and other smaller vendors. HP expects that its reputation for quality and the completeness of its EtherTwist line will provide a competitive advantage.

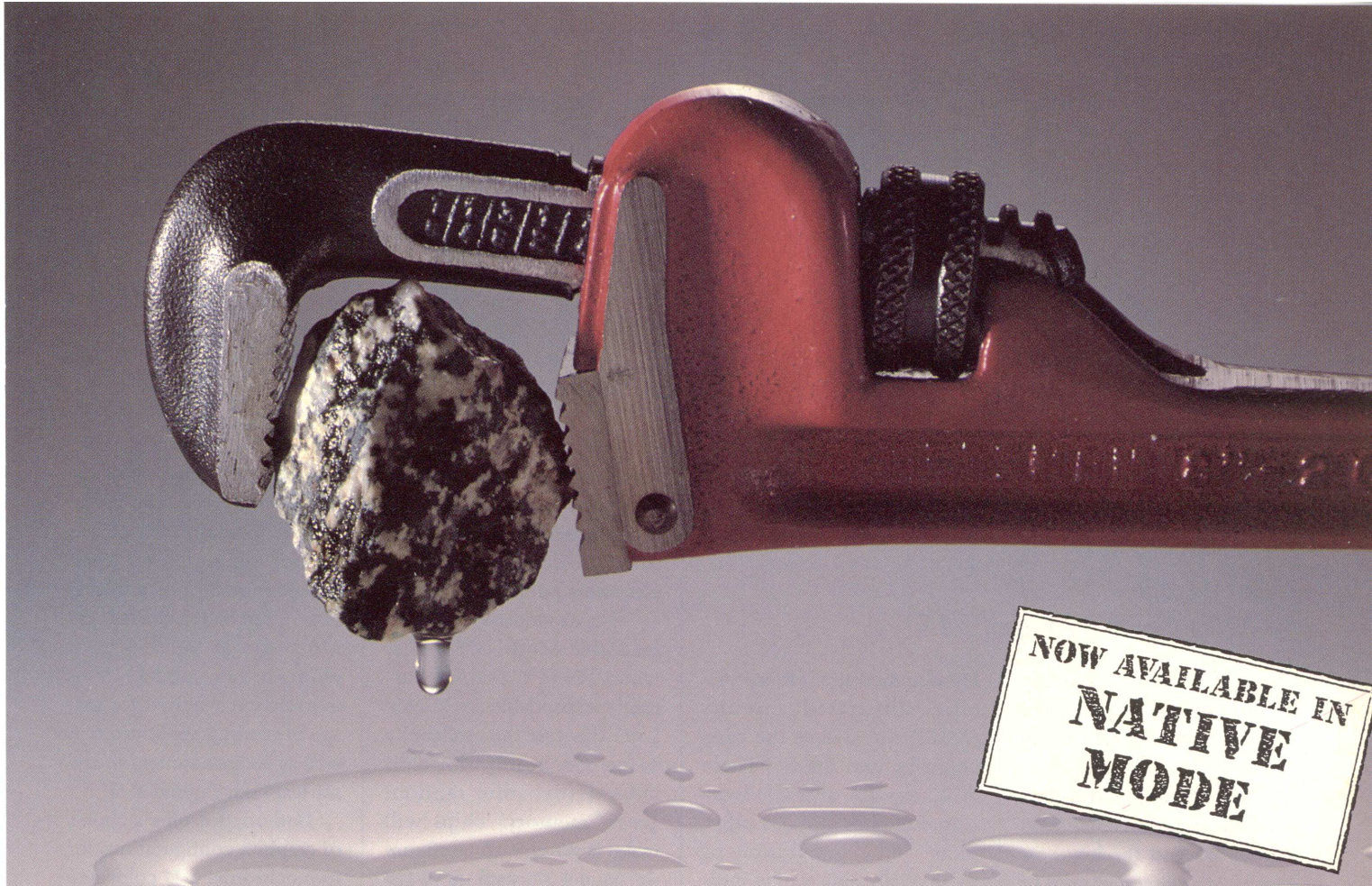
When the EtherTwist line reaches dealers, the company expects to be the first vendor to offer customers all three components — hubs, adapter cards and transceivers — from one manufacturer. Some of the low-priced competitors offer an OEMed adapter card to complete their product lines, but most offer only some pieces of a PC LAN solution.

Another innovation that EtherTwist will bring to the dealer channel is network management capabilities for small twisted pair networks. StarLAN 10 hubs were not managed, and competitors provide network management only on more expensive hubs designed for networks with dozens of nodes. With the modular EtherTwist hubs, customers can buy a managed hub for 12 nodes and then add stackable hubs to a rack as their network grows.

Even if EtherTwist products are popular with dealers and their customers, the transition to dealer channels could be laden with setbacks for HP if there is conflict between the direct channel and the dealer channel. In order to reduce the potential for channel conflict, HP plans a lead-passing program to boost support for dealer sales. HP sales representatives who inform dealers of a network implementation opportunity will be compensated at the same level that they would have been for closing a sale themselves.

The direct sales force will switch from StarLAN 10 to EtherTwist as soon as EtherTwist products roll out at dealerships. StarLAN 10 products can't coexist with EtherTwist. If EtherTwist products were to come to dealerships when the StarLAN 10 products were still being sold through direct channels, HP would be torn between whether to help dealers launch a successful debut for EtherTwist or help the direct sales force continue to sell StarLAN 10 products at reduced prices. What customer would pay the $250 list price for a StarLAN 10 MAU when the redesigned Ethertwist one goes for $159?

The more that customers buy EtherTwist from their local dealers, the better it is for HP. The company's cost of sales rose during 1989, ending its fiscal year with a cost of sales amounting to 51.7 percent of net revenue. At a recent meeting with securities analysts, John Young said that decreasing cost of sales was the company's number one financial goal for the 1990 fiscal year. If the dealer channel proves a more cost effective way to sell products that HP once considered too complex or customizable to sell through retail channels, look for other new products to follow EtherTwist at your local dealership. ■



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NEWS & TRENDS

HP Speeds Up Series 300 Workstations

Offers 12 Mips, 50 MHz Series 375 And 345

Customers who need speedy workstations won't need to wait for Motorola's 68040 processors to become available later this year. Hewlett-Packard's expandable HP 9000 Model 375 and the low-cost Model 345 deliver 12 mips of processing power with a 50 MHz 68030 processor. Later this year the Model 375 will run even faster when HP makes a 25 MHz 68040 version available as a board upgrade for the promotional price of $2,000.

Customers with the less powerful 330, 350, 360 and 370 models can upgrade their systems to the Model 375 and eventually to the 68040 processor that will provide up to 10 times the floating point and three times the integer performance of the 68030 processor.

By the second half of 1990, 68040 upgrades will be available for Apollo Series 3500 and Series 4500 workstations. The upgrade involves an exchange of CPU boards, allowing customers to retain their existing system components.

Both the Model 345 and Model 375 incorporate five HP-designed application-specific integrated circuits (ASICs) that reduce the parts count by two thirds. These ASICs replace over 200 integrated circuits and 200 other parts. The integration of these ASICs reduces the incidence of defective parts and minimizes heat related failures because the system operates at lower temperatures.

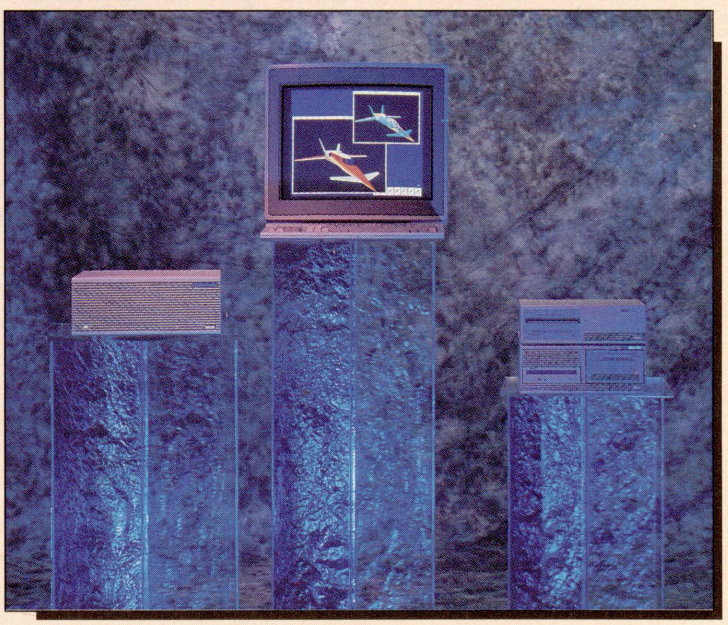
Model 345 has a base price of $8,995 for a monochrome model with 4 MB of ECC (error correcting) RAM (random access memory). This model can support up to 16 MB of RAM and 32 KB of onboard cache with a 64-bit memory bus.

Model 345 and new versions of the 16.7 MHz Model 340 can be configured with a 200-MB integrated disc drive, the first internal disc drive offered for Series 300 workstations. This integrated 3 1/2-inch disc uses the SCSI disc interface and is available with the system for $3,250 or as a customer-installable upgrade for $3,600. Target application areas for the Model 345 include design automation, software development and electronic publishing.

The expandable and upgradeable Model 375 comes with 8 MB of ECC RAM, currently expandable to 32 MB. Later this year the availability of memory boards with 4 MB DRAM (dynamic random access memory) chips will make it possible to configure the Model 375 with up to 128 MB of RAM.

The Model 375 comes standard with two slots but can have up to 12 I/O slots so that you can customize your systems with a variety of interface and accessory cards. The expandability options include support for a VME expander with four available slots. Prices for the Model 375 begin at $21,995 for a monochrome model. This workstation is suited for image processing applications as well as design automation and software development.

Both models offer a choice of graphics configurations for monochrome, 2-D color and 3-D solid rendering. These new workstations are scheduled to ship in the first quarter of 1990. *—Peggy King, West Coast Editor*



HP's expandable HP 9000 Model 375 delivers 12 mips of processing power with a 50 MHz 68030 processor.

HP-PA Performance Gets 70 to 100 Percent Boost With New High-Density Chip

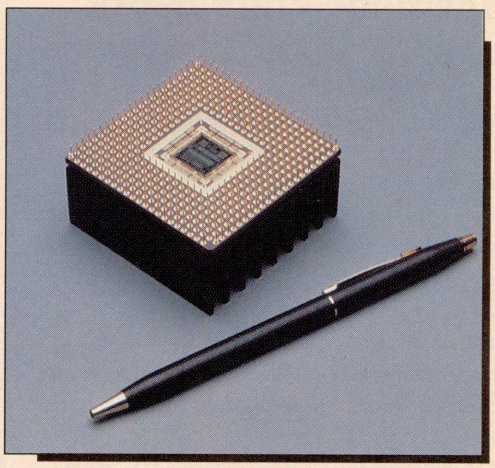
A High-End Minicomputer Based On New Chip Will Be Flagship Of MPE, XL Family

HP has announced that a CMOS (complementary metal-oxide semiconductor) chip with nearly a million circuits will be introduced in a high-end minicomputer that will have 70 to 100 percent higher performance than the top-of-the-line Model 960 introduced last September. The chip takes the CPU functions of 100 chips and compresses them into one chip.

Wim Roelandts, vice president and general manager of HP's Computer Systems Group, said that customers can expect to see 60 to 70 percent increases in performance every year for at least the next five years. Advances in chip production technology within HP's Circuit Technology Group are a factor in the company's ability to continue to deliver these increases in performance. In the future, advances in superscalar architectures that make it possible for more than one instruction to be processed in a clock cycle, and HP's ability to provide symmetric multiprocessing, will be additional factors.

Because of the reduced physical size of the CMOS chip implementation, system architects will have the flexibility to couple several CPUs in symmetric multiprocessing configurations.

The top-of-the-line Series 900 model is expected to process 60 to 70 transactions per second compared to 31 transactions per second on the Model 960. The next introduction of a product that uses the faster RISC processor is expected to be a high-end product in the Series 800 family of multiuser minicomputers and servers, followed by a low-end product to replace the CISC-based Micro 3000s. *—Peggy King, West Coast Editor*



HP has introduced a CMOS chip that takes the CPU functions of 100 chips and compresses them into one.

HP To OEM Fault-Tolerant Computers Based On UNIX Operating System

HP And Sequoia Relationship Includes Joint Technology Exchange And Marketing Agreements

Hewlett-Packard has announced its third HP-PA licensing agreement in less than a year. Sequoia Systems Inc. (Marlborough, MA), a manufacturer of fault-tolerant computers based on the UNIX operating system, will license HP's Precision Architecture (HP-PA) technology and use HP-PA chip sets in its computers. Sequoia's first computers, the Series 200, used the Motorola 68020 microprocessor. Sequoia's current line of computers, the Series 300, use the Motorola 68030, and there may be another series of Motorola-based computers before systems based on HP-PA became available in the next 24-30 months.

HP benefits from this technology exchange by gaining the right to incorporate Sequoia's patented fault-tolerant multiprocessing technology in HP-PA chips. The cross-licensing agreement also gives HP the right to incorporate Sequoia's technology in future UNIX-based multiprocessing systems.

HP and Sequoia also announced a multiyear, multifaceted, original equipment manufacturer (OEM) agreement. By 1992, HP will sell Sequoia systems based on HP-PA under an HP label while Sequoia will sell HP-PA-based systems under its own label. In the meantime, Sequoia will integrate HP disc and tape drives in its systems. HP printers also may be included in future Sequoia systems.

HP hopes to increase its market share in the telecommunications industry where customers need fault-tolerant systems for uninterrupted computing. Nearly 20 percent of Sequoia's installed base is in the telecommunication industry. As part of the OEM and equity agreement, Sequoia has agreed not to compete with HP in this industry. Therefore, all HP-PA based Sequoia systems sold to telecommunications customers would be HP-labeled. Sales of the fault-tolerant systems in the telecommunications industry would complement HP's sales of minicomputers for alarm-monitoring, network operation support, surveillance and maintenance.

The non-exclusive portion of the HP/Sequoia marketing agreement allows HP to compete with Sequoia in selling HP-PA based fault tolerant systems to customers in other industries. The agreement includes a $5.8 million equity investment that Sequoia sources estimate to be slightly less than a 10 percent interest. According to Sequoia chairman and CEO Gabriel Fusco, HP's cash investment will help Sequoia prepare for a period of rapid growth. *—Peggy King, West Coast Editor*

EDA Systems Ports Design Management Framework Software To 9000 Platform

PowerFrame Shortens Circuit Design Cycle

EDA Systems Inc. and HP signed a joint marketing agreement in which EDA will port its design management framework, PowerFrame, to HP 9000 platform and EDA will become a software supplier for HP workstation-based systems sold in the electronic design market.

As part of the agreement, HP will assist EDA Systems in marketing the ported software. EDA Systems will retain responsibility for all licensing, distribution and support of the ported software.

Contact EDA Systems Inc., 3255-3 Scott Blvd., Bldg. 3, Santa Clara, CA 95054-3013; (408) 986-9585.

Circle 369 on reader card

HP Unveils Disc Drives For New Workstations

Model 330S And 660S Boast 332-MB And 664-MB Capacity

HP has introduced the HP 6000 Model 330S and 660S disc drives designed for the new HP 9000 Model 345 and 375 workstations. These hard disc drives also can be used on any Series 300 workstations that has a small computer systems interface (SCSI) running HP-UX release 7.0.

The base configuration for both models includes one Winchester disc (either a 332-MB on the Model 330S or a 664-MB on the Model 660S) and two empty slots. Customers can use the empty slots for any of the following: peripherals, additional hard disc drives (either 332 or 664-MB), a digital-audio tape (DAT drive), a CD-ROM drive, or a rewritable-optical disc drive.

The base units with two empty slots cost $4,975 for the 332-MB capacity and $7,875 for the 664-MB model. —*Peggy King, West Coast Editor*

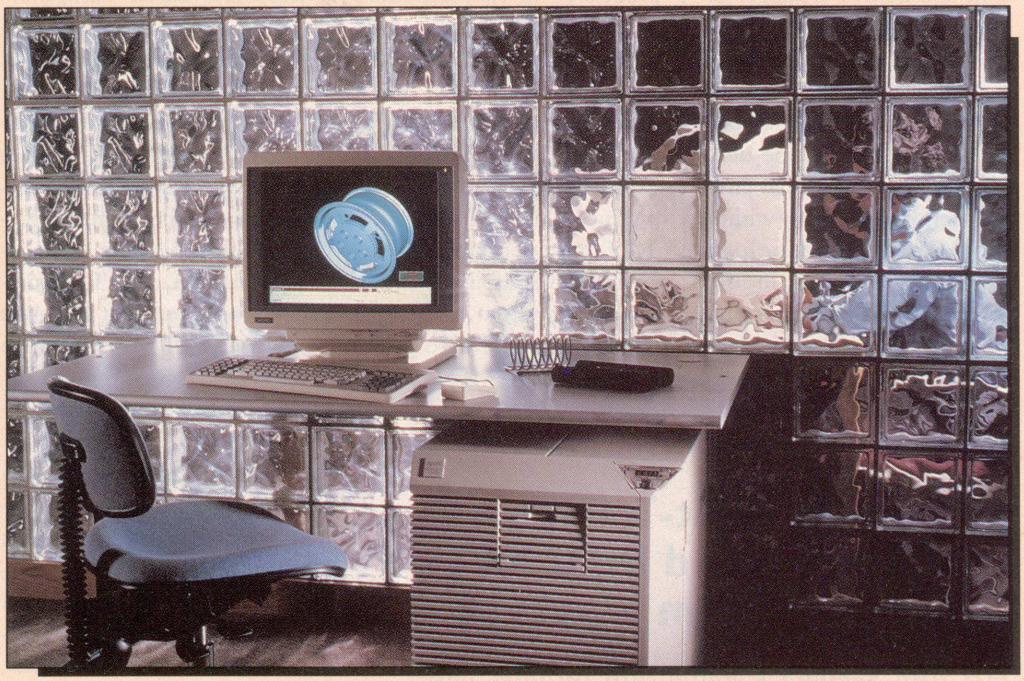
Apollo Division Wins Second Contract For Series 10000

CERN To Use Systems For High-Energy Physics

HP, through its Apollo Division has announced a contract award from the CERN Institute, a Geneva-based nuclear-research center, to supply Apollo Series 10000 personal supercomputers and visualization systems.

This is the second contract recently awarded to Apollo for its Series 10000. The company also has received a $7.5 million contract to supply similar equipment to the U.S. Department of Transportation.

CERN will use the Apollo systems for high-energy physics applications and to monitor and control experiments and other projects. The systems also will serve as central-computing resources for CERN's extensive network of computers. This network includes more than 200 other Apollo personal supercomputers and desktop workstations, plus computers and systems from other suppliers.



Apollo was awarded a contract to supply Apollo Series 10000 personal supercomputers and visualization systems to CERN Institute.

CERN, which has received two Nobel Prizes for experimental physics, has built a 27-kilometer-long particle accelerator to study the structure and properties of elementary particles. The Apollo equipment will be used by scientists on the accelerator project as well as researchers involved in other CERN projects.

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New PC LAN Hardware To Sell Through Dealer Channels

HP Replaces StarLAN 10 Hardware With HP EtherTwist For Unshielded Twisted Pair

Hewlett-Packard's Roseville Networks Division (Roseville, CA) has introduced the HP EtherTwist product line. It's based on the emerging Type 10Base-T standard for twisted pair cabling and a WireTest Instrument to check cabling for conformance to this standard. These five new networking products will be sold through PC dealerships that carry networking products and provide support and service for PC LANs.

HP EtherTwist products are designed to work with ordinary telephone cabling (unshielded twisted pair) and will replace the Starlan 10 product line. All EtherTwist products are backward-compatible with StarLAN 10 products and can be used with either shielded or unshielded twisted pair cabling.

With one exception, customers who have StarLAN 10 products need not replace existing hardware in order to add EtherTwist products to a PC LAN. The exception is that StarLAN 10 hubs can't use LAN-based network management. Customers who want to manage their network from a central PC on the network need to replace their StarLAN 10 hub with HP EtherTwist Hub Plus. StarLAN 10 customers will receive upgrade credit toward the purchase of HP EtherTwist Hub Plus.

The HP Ethertwist Product Line includes the following products:

EtherTwist Hub and ***Hub Plus*** both provide 12 twisted-pair ports, support 100 meters of cable and include an RS-232 port. These new hubs have been redesigned to a 19-inch form factor so that they can be rack mounted, stacked on a table top or mounted to a wall. The industry standard dimensions make it possible to expand by adding hubs to a rack.

If the HP EtherTwist Hub or Hub Plus is configured with a link integrity signal, it can be used with existing StarLAN 10 adapters, transceivers and hubs. The link integrity signal, part of the Type 10 Base-T standard, is a pulse that tests if a twisted pair is connected to a transceiver.

The HP EtherTwist Hub Plus communicates over PC LANs using the HP OpenView Hub Manager software. HP OpenView Hub Manager, which is based on the SNMP (simple network management protocol) standard for device management, works with MicroSoft Windows. Because SNMP allows for integration of the HP EtherTwist Hub Plus with other SNMP-based managers, it's possible to have centralized management in a multivendor environment that also includes other types of cabling. Thin coaxial cable can be connected directly to the hub; thick coaxial cable or fiber optic cable can be connected via a transceiver.

HP EtherTwist Adapter Cards are available for personal computers with AT or MicroChannel (MCA) backplanes. There is no EISA (extended industry standard architecture) adapter card. Customers using HP EtherTwist adapter cards with a StarLAN 10 Hub can make the card backward compatible by flicking a switch located on the card.

The 27245A EtherTwist PC Link works with HP Vectras, Compaqs and IBM PC/XT/ATs and PS2s with AT backplanes to provide direct connection to a twisted pair network. The HP 27246A works with IBM PS/2 models with Micro Channel backplanes. Both the AT and the Micro Channel backplane cards have been tested with network software from HP (OfficeShare or LAN Manager), versions of Novell Netware for 286 PCs and 386 PCs with DOS clients, and 3Com's 3+Open.

The ***HP EtherTwist Transceiver*** is a smaller, more inexpensive replacement for the StarLAN 10 MAU (medium attachment unit) because it was redesigned with surface mount technology. PC adapter cards like the HP EtherTwist PC Link have built-in transceivers and need no additional transceiver.

The HP EtherTwist Transceiver is designed for use with devices where direct attachment isn't possible. In cases where a workstation or a PC supports Ethernet but uses a different adapter card, the HP EtherTwist transceiver can provide a connection to twisted-pair cable for LAN interface cards and device AUI ports. The link beat switch on the transceiver allows it to be configured for use with Type 10BASE-T compliant hubs when the switch is set on, or to StarLAN 10 hubs when the switch is set off. There is also a switch that allows the transceiver to be used with repeaters.

Dealers who carry the HP EtherTwist product line will be able to purchase HP Wire Test Instrument, but this instrument will not initially be marketed through dealer channels. Dealers can use the Wire Test Instrument to test their customers' twisted-pair cabling for compliance with Type 10BASE-T standards. The instrument performs tests that evaluate the key parameters of the emerging standard, provides diagnostic information on each test performed, and has an RS-232 printer port to allow a dealer to print out the results of tests.

The Wire Test Instrument and all EtherTwist products come with Installation or Operating Manuals. The PC adapter cards also come with "Quick Install" one-page reference guides. *—Peggy King, West Coast Editor*

Note: If you have any questions regarding a HP announcement mentioned in **News & Trends**, please contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.

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Contact Relational Technology Inc., 1080 Marina Village Pkwy., Alameda, CA 94501; (800) 4-INGRES.

Circle 373 on reader card

VADS Available For 9000/300, HP 64000-UX

Provides Solutions For Ada Market

HP and Verdix Corp. (Chantilly, VA) have announced the availability of the Verdix Ada Development System (VADS) for HP 9000 Series 300 computers and HP 64000-UX in-circuit emulators and analyzers.

The HP 9000 Series 300 workstations support VADS for native development, with version for Motorola 68020, 68030 and Performance Semiconductor PACE1750A embedded-microprocessor development.

Interfaces to HP 64000-UX in-circuit emulators and analyzers from HP 9000 Series 300 and DEC VAX/VMS computers provide access to execution, debug and integration tools for embedded-microprocessor software.

VADS on the HP 9000 Series 300 is $7,500. The system includes a validated MIL-STD 1815A, optimizing Ada compiler and a full-screen symbolic debugger. The system is available from Verdix.

The VADS embedded-microprocessor-development system is $15,000. Included are a validated MIL-STD 1815A optimizing Ada compiler and full-screen symbolic debugger also available from Verdix.

Software interfaces from HP 9000 Series 300 and DEC VAX/VMS computers to the HP 64000-UX programmatic interface, and a real-time library from Verdix are $5,000 each. Prices for Programmatic interfaces to HP 64000-UX emulators and analyzers begin at $1,155 for a single-user license and are available from HP.

Verdix Corp., 14130-A Sullyfield Circle, Sullyfield Business Park, Chantilly, VA 22021; (703)378-7600.

Circle 370 on reader card

HP Replaces Eagle Disk Drives

New Family Means Lower Price And More Reliable Models

Hewlett-Packard introduced a new family of 5 1/4-inch hard-disk storage systems for HP 3000s (both MPE V and MPE XL), HP 9000 Series 800 multiuser systems and HP 1000 RTE A and RTE 6 systems. The Series 6000 replaces the HP 7936 and 7937 high-end systems (the Eagle series) and the HP 7959B, HP 7962B and HP 7964B in the mid-range.

The new disk drives have mean-time-between-failure (MTBF) ratings that are between 35 to 50 percent longer than the previous models. In addition, they are priced as much as 55 percent lower than the products they are designed to replace.

The HP Series 6000 works with HP-IB disk interfaces (including those that have cache memory) and with HP-FL, HP's proprietary fiber-optic interface. The family comes in three capacities with availability and pricing as follows: 335 MB model available for HP-IB only, $5,275; 670 MB model for HP-IB, $8,075; for HP-IB with cache memory $9,575; $8,375 for HP-FL, and for 1.34 GB for HP-FL only, $15,575.

Disk drives in this series can be ordered now for shipments beginning in April. — *Peggy King, West Coast Editor*

Q-Calc RealTime Linked To HP NCS, QV Trading, Market Data Interface

Traders Can Monitor Price Changes

UniPress Software has announced that Q-Calc RealTime spreadsheet has been linked to HP's Network Computing System (NCS) and QV Trading's market data interface (MDI).

Now Q-Calc RealTime users can bring in realtime analytics as well as prices from over 30 live market datafeeds such as Telerate, Reuters and Standard and Poor's. Q-Calc RealTime is a Lotus 1-2-3 compatible realtime spreadsheet designed for easy integration in UNIX/Xenix financial workstation applications requiring continuous price monitoring and analysis.

Traders using Q-Calc RealTime can monitor price changes displayed second-to-second in the spreadsheet, be alerted when a price in a selected range occurs and also use macros as well as other formulas to do automatic or ad hoc spreadsheet analysis. Also, results can be illustrated with realtime graphics.

Contact UniPress Software, 2025 Lincoln Hwy., Edison, NJ 08817; (201) 985-8000.

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		Belgium	(056) 41.83.99	Holland	(31) 2503-89700
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Buffalo	(716) 825-4021	Canada	(613) 448-2333	Mexico	(525) 254-3274
Cincinnati	(513) 891-7867	Denmark	(4) 2.63.22.33	Scandanavia	46 0910-364 80
Los Angeles	(213) 432-7713	France	(1) 45.88.88.30	UK	(0223) 460881

BRADMARK
Computer Systems Inc.

CIRCLE 108 ON READER CARD

Mentor Graphics To Share Next Generation Architecture

To Participate In CFI Integration Project

Mentor Graphics Corp. will share the architecture of its next generation environment with the members of the CAD Framework Initiative (CFI). In addition, the company will participate in the development of CFI's demonstration for the 1990 Design Automation Conference (DAC) and will provide the services of its OpenDoor Integration Laboratory, free of charge, to help create the DAC demonstration.

The demonstration at DAC will provide designers with the first view of CFI's proposed standard data model and procedural interface that allows tools from multiple EDA vendors to be integrated together. Mentor Graphics will participate in the demonstration efforts by showing the new procedural interface working between its tools and those of other EDA vendors.

Contact MP Associates Inc., 7490 Clubhouse Rd. #102, Boulder, CO 80301; (303) 530-4562.

Circle 368 on reader card

Instant Ignition Program Provides Pre-Load Software Option On Workstations

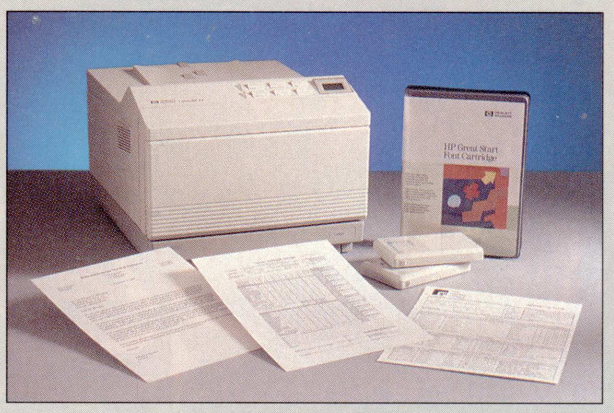
No Extra Charge For Instant Ignition On HP 834 CH And Series 300 Workstations

When a customer ordered a workstation system from HP, it used to arrive in bits and pieces. The workstation and software might be shipped from Ft. Collins, CO, the disc drives from Boise, ID and a printer from San Diego, CA. When all the pieces finally arrived, an experienced user could expect to spend at least four hours (a first-time user would spend much longer) configuring HP-UX and the X Window System.

The latest addition to the HP 9000 Series 800 family is the first workstation with a pre-installed and configured X Window System. The 14-mips 2-D Model 834 CH sells for $19,375 with a 16-inch color monitor; $22,600 with a 19-inch color monitor. The 304-MB hard disc with an HP-IB interface sells for $5,675 regardless of whether or not the option of pre-installed HP-UX and preconfigured X Window System is chosen.

The first time a user sits down in front of a workstation that has the instant ignition option on a disc, a login screen based on OSF/Motif and the X Window System appears so that the user can begin work immediately.

These "instant ignition" discs come in a 161-MB capacity for $3,800 and a 323-MB capacity for $5,800. —*Peggy King, West Coast Editor*



HP's LaserJet IIP.

HP LaserJet IIP Is Printer Of The Year

Annual Printer Of The Year Award Bestowed By BIS CAP International

The HP LaserJet IIP captured the Annual Printer of the Year award presented by BIS CAP International. Priced at $1,495, the LaserJetIIP sets a new price/performance standard that creates a new "personal laser printer" market segment and a new challenge for competitors according to BIS CAP.

The award was presented at BIS CAP's eighth Annual Print Quality Seminar, an industry forum devoted to the exchange of information on print quality for text and graphics. Judged by a panel of industry observers and BIS CAP analysts, the award is presented annually to the printer product having the greatest impact on the printer industry from either a market or technological standpoint.

Oracle Announces CIM Strategy

New Group Goes After $25 Billion U.S. Market

Oracle Corp. has announced its entrance into the CIM marketplace. The company's ORACLE RDBMS will serve as a common foundation for seamlessly integrating applications, databases and information in an enterprise-wide CIM solution encompassing the front office, engineering, the shop floor, operations and MIS.

Oracle's three-pronged CIM strategy includes the ORACLE RDBMS as a foundation for all application development and integration; the company's integrated families of manufacturing and financial applications; and its team of CIM Partners and blue-chip vendors who have developed Oracle-based engineering or shop floor applications.

Contact Oracle Corp., 20 Davis Dr., Belmont, CA 94002; (415) 598-8000.

Circle 367 on reader card

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From now until June 30, 1990, just trade in your VAXstation™ 2000 workstation and Digital will give you $2,000 off the purchase price of our VAXstation 3100 workstation.

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	VAXstation 2000	VAXstation 3100
VUPs	1	4
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Planes	1, 4, 8	1, 8

And, even though the VAXstation 3100 workstation is an upgrade, you can use all the same software you've been using on the 2000. With no rewriting.

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NEW PRODUCTS

IPT Extends Compatibility Of uShare

Information Presentation Technologies Inc. (IPT) has extended the implementation of its uShare UNIX-oriented multiplatform network software to the HP 9000 (300 and 800 Series), the Sun 4 and Sparc-Station I, the DEC 3100 and the MIPS computer environments.

uShare is a fully AppleShare-compliant file server software product that resides on high-performance UNIX computers and makes the files and other resources of the host computer available to Macintosh computers that exist as workstations on the resulting network. Because uShare is fully Apple Filing Protocol (AFP) compliant, Macintosh application software works without modification. uShare supports EtherTalk Phase I and Phase II as well as a LocalTalk interface to Sun, MIPS and Sony. The software also is implemented on Apollo computers.

uShare offers a virtual disk feature that permits Macintosh computers to run discless by storing the Macintosh O/S and the individual users' programs and data files on a virtual disc that resides on the UNIX host. The virtual disc is private to the user who creates it as well as password protected, providing a high degree of security for sensitive files.

Contact IPT, 5000 North Parkway, Ste. 304, Calabasas, CA 91302; (818) 347-7791.

Circle 400 on reader card

STARPRINT B.01 Features Display Option

Orion Systems Technology Inc. has announced Version B.01 of STARPRINT, the report management system for the HP 3000. STARPRINT lets you print HP 3000 reports to a spooled or slaved printer, using the same port as your terminal or PC.

The new version includes the option of displaying reports to your terminal, with easy scroll left/right, page down/up, and go-to line features. You also can choose whether to print all pages, or select only the pages you want, saving wasted paper costs.

The ability to dynamically change the print style (font, size, etc.) is provided for both slaved and spooled printers. Print files are automatically archived, so reprints require no special operator intervention.

STARPRINT features online menu and help screens and has multilevel security to protect sensitive documents from access by unauthorized users. You may have your own programs print directly to a slaved printer using STARPRINT. No PM code is used, so system upgrades aren't a problem.

STARPRINT is priced at $1,295 and includes one year of support and upgrades. MultiCPU discounts are available.

Contact Orion Systems Technology Inc., 325 S. El Dorado, Ste. 102, Mesa, AZ 85202; (602) 894-6983.

Circle 399 on reader card

HERMES Offers X.25 PAD Emulation On 3000

Hermes Co. has begun shipping PADEMU, its X.25 PAD emulation software package. PADEMU, for PAD Emulation, allows a terminal user connected to an HP system to use an X.25 Network Link to logon to HP and nonHP systems that provide PAD support. This multivendor access capability allows HP computer users to extend the utility of their existing network services to systems outside the HP environment opening up access to other computers and public database services like CompuServe.

The PAD Emulator supports the X.3, X.28 and X.29 recommendations as necessary for HP systems support. Versions are available for HP 3000 and HP 9000.

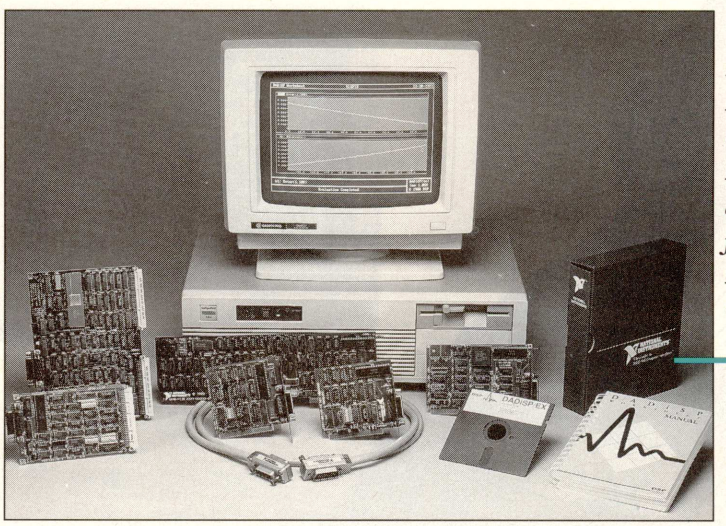
Contact Solution Centers International, P.O. Box 2441, Placerville, CA 95667; (800) 622-0630 or (916) 622-0630.

Circle 394 on reader card

DADiSP Worksheet Supports National Instruments Boards

DSP Development Corp., developers of the DADiSP Worksheet for graphic display and analysis of scientific and technical measurements, and National Instruments Corp., supplier of IEEE-488 (GPIB or HP-IB) interfaces, will offer DADiSP Worksheet packages that support the National Instruments GPIB interface boards for the IBM PC/XT/AT, IBM PS/2 and compatibles.

The DADiSP Worksheet is designed for



National Instruments Corp. offers the DADiSP data analysis software from DSP Development Corp.

data analysis of signal waveforms generated from applications in laboratory research, electronic test and measurement, physiological monitoring and digital signal processing. It combines menu-driven analysis tools and windowed graphics to handle complex tasks.

DADiSP interfaces directly with the GPIB hardware through the National Instruments NI-488 software driver that is designed specifically for each interface board. DADiSP works with any National Instruments board that has an NI-488 software driver. It currently supports the GPIB-PCII, GPIB-PCIIA, GPIB-PCIII and AT-GPIB for the IBM PC/XT/AT and compatibles.

Single-unit DADiSP Worksheet packages range in price from $895 to $6,995, depending upon the host computer.
Contact National Instruments Corp., 12109 Technology Blvd., Austin, TX 78727-6204; (512) 794-0100.

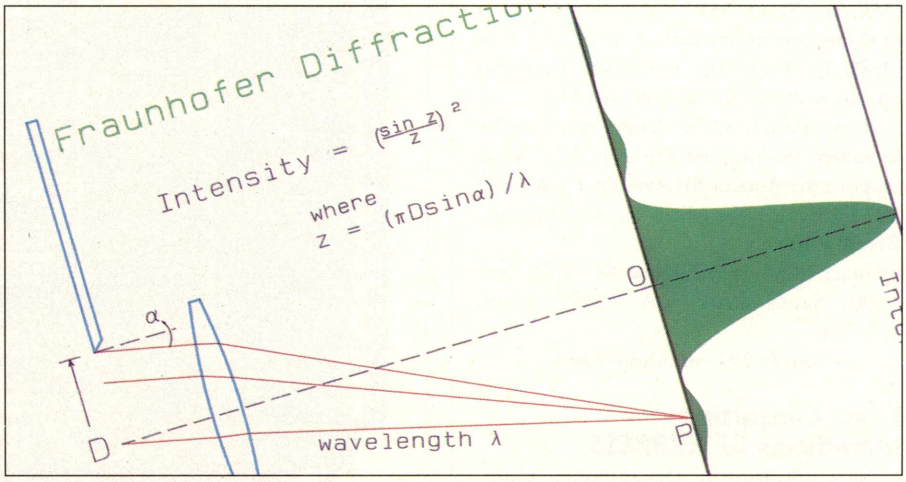
Circle 398 on reader card

Datatap Adds Drawing Features

Temple Datatap Graphics has released Revision 3.2 of its Datatap graphics package in response to users requests to have the ability to add drawings to their graphs, such as a curved arrow or a chemical structure diagram.

Revision 3.2 incorporates a draw section that permits annotating a graph with drawings, similar to what might be done with MacDraw on the Macintosh. Several graphics primitives, such as lines, circles, etc., are available. They may be placed and resized using the mouse, the knob, or the arrow keys. A complex picture is made by choosing a series of the appropriate objects and placing them on the drawing. The drawing can be edited by moving or reshaping the objects. The drawing is maintained internally as a list of vectors, so the drawing always has the full resolution of the plotter or other output device.

Temple Datatap Graphics is the HP 9000 BASIC version of Temple Graph, which is available for PCs and UNIX workstations. It sells for $299.



Temple Datatap Graphics for the HP 9000 adds drawing features.

Contact James Associates, 7329 Meadow Court, Boulder, CO 80301; (303) 530-9014.

Circle 388 on reader card

Lasersoft/JetSetter Provides Reduction Printing

Business Systems International has released a new version of Lasersoft/JetSetter, the software tool that links the HP LaserJet family of printers and the HP 3000 (MPE and MPE XL).

Version 2.0 of Lasersoft/JetSetter supports reduction printing. This feature allows for the printing of two logical pages per physical page (2-up) and four logical pages per physical page (4-up).

Lasersoft/JetSetter allows for printing of data processing reports on the HP LaserJet family of printers without application modification. Other features of the program are page set-up, a font management module that includes 74 fonts, and utilization of the ENV File command. The Flexset option allows you to expand or compress the printed output and position it on the page for easy-to-read, professional looking reports.
Contact Business Systems International Inc., 20942 Osborne St., Canoga Park, CA 91304; (818) 998-7227.

Circle 395 on reader card

RealTime Linked To NCS, QV Trading's MDI

UniPress Software Inc.'s Q-Calc RealTime spreadsheet has been linked to HP's Network Computer System (NCS) and QV Trading's market data interface (MDI). Now Q-Calc RealTime users can bring in realtime analytics as well as prices from more than 30 live market datafeeds such as Telerate, Reuters and Standard and Poor's.

Q-Calc RealTime is a Lotus 1-2-3 compatible realtime spreadsheet designed for easy integration in UNIX/Xenix financial workstation applications requiring continuous price monitoring and analysis.

Traders using Q-Calc RealTime can monitor price changes displayed second-to-second in the spreadsheet, be alerted when a price in a selected range occurs and also use macros as well as other formulas to do automatic or ad hoc spreadsheet analysis.

Priced from $1,995 with realtime graphics, Q-Calc RealTime is available for most UNIX/Xenix computers including the HP 9000/300. Source code is also available from UniPress.
Contact UniPress Software, 2025 Lincoln Hwy., Edison, NJ 08817; (201) 985-8000.

Circle 396 on reader card

Santa Cruz Operation Announces SCO MPX

The Santa Cruz Operation Inc. (SCO) has announced SCO MPX, a multiprocessing extension to the SCO UNIX System V/386 Release 3.2 operating system that unleashes the full power of the new 386- and 486-based multiprocessing computers built on

Industry Standard Architecture (ISA), Extended Industry Standard Architecture (EISA) or Micro Channel Architecture (MCA). SCO MPX also works as a multiprocessing extension to SCO's new Open Desktop, the complete graphical operating system for 386 and 486 PCs.

In addition to OEM designs based on the Corollary 386/smp and 486/smp, SCO MPX supports the Apricot MC486, the COMPAQ SYSTEMPRO, the Mitac Series 500 and the Zenith Z1000.

Contact SCO, 400 Encinal St., P.O. Box 1900, Santa Cruz, CA 95061; (408) 425-7222.

Circle 393 on reader card

Eagle Consulting Introduces RF EXPRESS

Eagle Consulting & Development Corp. (ECD) has announced the MPE XL implementation of its RF EXPRESS, a 100 percent portable, 100 percent on-line, hand-held terminal driver.

ECD's ASK MANMAN RF EXPRESS module will allow ASK MANMAN customers to have 100 percent portable, 100 percent online access to physical inventory, cycle count and material movement transactions. As with all RF EXPRESS modules, optional barcoded labels can be printed.

ECD also announces the integration of LINX Work-In-Process terminals into its RF EXPRESS product line.

Contact Eagle Consulting & Development Corp., 170 Kinnelon Rd., Ste. 3, Kinnelon, NJ 07405; (201) 838-5006.

Circle 392 on reader card

SOTAS LINK Delivers Financial Information

SOTAS International, producer of Accountable Solutions software systems for HP 3000s, has announced SOTAS Link, a micro-to-host link for delivering financial information to top decision makers.

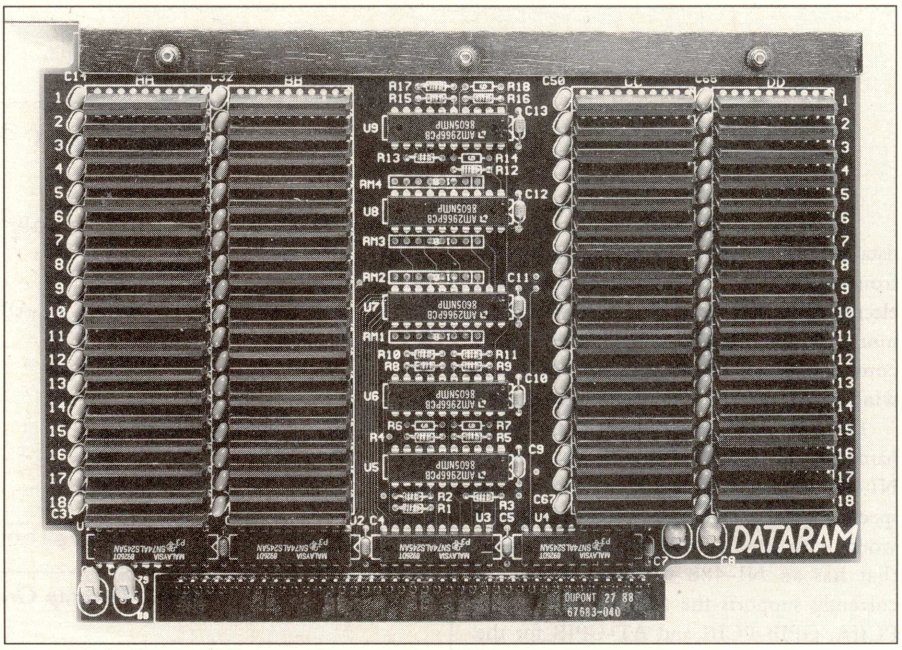
The integration of SOTAS Link with General Ledger also extends the General Ledger's data extraction and manipulation resources to the microcomputer level. SOTAS Link brings together spreadsheet flexibility, communications speed and the power of the SOTAS General Ledger and Financial Reporting System into a single desktop solution.

In a typical configuration, the SOTAS General Ledger and Financial Reporting system resides in the HP 3000 host computer. Through SOTAS Link, the user has access to spreadsheets, such as Lotus 1-2-3, VisiCalc and other DIFs, DBMS files and graphics. Any HP 3000 compatible microcomputer, such as the Vectra, HP 150 or IBM clone PC provides host processing power at the user (PC) level.

SOTAS Link is available for a one-time charge of $5,000 per host computer. An unlimited number of users may be supported from a single SOTAS Link installation.

Contact SOTAS International, 192 Merrimack St., Haverhill, MA 01830; (508) 372-0770.

Circle 391 on reader card



Dataram Corp.'s DR-40 memory expansion board is available in 4- and 8-MB versions to boost maximum system memory to 32 MB.

High Performance Memory For Apollo/HP Workstations

Dataram Corp. has announced plug-in memory expansion boards for Apollo workstations offering memory expansion to 32 MB. The new DR-40 memory expansion boards, available in both 4-MB and 8-MB versions, boost maximum system memory to 32 MB on Apollo/HP 3500/4500 and DN4000 workstations and the DSP4000 server. Dataram's DR-30, available in 2-MB modules, increases the performance of the Apollo/HP DN3000 server. The new DR-30 and DR-40 units combine cost efficiency with Dataram's 20-plus years of experience to expand on Apollo expertise in the workstation area.

The DR-40 is priced at $1,800 for 4 MB and $3,100 for 8 MB.

Contact Dataram Corp., P.O. Box 7528, Princeton, NJ 08543-7528; (609) 799-0071.

Circle 383 on reader card

Eyring Releases Enhanced Impression

Eyring Inc. has announced an enhancement to its Impression work instruction management product. Version 3.1 of the product is designed to simplify user interface by increasing system functionality.

Impression serves as a link between engineering management and the manufacturing assembly floor by combining images with explanatory text. In turn, Impression provides production managers with feedback from the floor to simplify auditing. Impression is MS-DOS based and runs on hardware from HP, DEC, IBM and Tandem Computers.

Impression is sold on a per workstation basis. Quantity discounts are available. Each license includes authoring, display and grayscale capabilities. Impression is designed for use on a local area network.

We're the Windows specialists.



Session for Windows: The next generation in HP terminal emulation is here.

Four years ago, Tymlabs pioneered the development of Session™ for Macintosh, an HP terminal emulator for the see-and-point desktop environment. Packing a sophisticated feature set into an intuitive, enjoyable and productive user interface, our Mac products have won acclaim from users and critics alike.

Building on the foundation of Microsoft® Windows for the PC, Vectra, and compatibles, we have been able to bring the power and ingenuity of our Mac-based emulators to Windows users as well. On both Mac and PC platforms, Session makes terminal emulation a full partner with today's desktop applications. For example, you can extract data from a database on your HP host and display it on your "terminal screen" (your Session window). Using the mouse or keyboard commands, you can copy the information into your PC or Mac-based spreadsheet, perform a few calculations, then paste the results into a memo which you send out via HPDESK. You can even run multiple concurrent sessions on the host, leaving HPDESK or a lengthy compile running in one window, while you go on to other HP-based activities in another.

If this sounds like the solution you've been waiting for, don't wait any longer. Whether your organization has PCs, Macs, or both, you can standardize on Session for all your emulation needs. And because Windows is the stepping stone to HP NewWave and OS/2 Presentation Manager, Session protects your investment in software and training as you move to these powerful new environments.

Tymlabs

CIRCLE 140 ON READER CARD

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811 Barton Springs, Austin, TX 78704 USA
(512) 478-0611
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Fax (03) 873-5667

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Quant Systems
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0784-438441
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Business Session for Windows was developed jointly by HPS Software Developments Ltd. and Tymlabs Corporation.

Putting The Pieces Together

TEAM COMPUTING

[BY PEGGY KING]

Team Computing is a new form of resource sharing made possible by client/server configurations, increased power at the desktop level, and software that works across platforms to harness the idle mips on networked machines.

Shared resources can include database servers, fast floating-point compute servers, large storage units, fast printers, and even the idle CPU on a colleague's desktop. Team Computing software products work across a network in client/server environments to make communal computers more productive, thereby freeing engineers to do the more creative tasks. When network resources are monitored and tracked automatically, system administrators have more time to optimize the system.

JOE GERSCH, RESEARCH AND DEVELOPMENT section manager for HP's Fort Collins Systems Division, has three ways of defining the *team* in Team Computing: HP and Apollo as a *team*, *teams* of computers and most important, *teams* of people.

HP and Apollo are working as a team to expand the resources of engineering networks. Before their merger, both HP and Apollo had development groups that explored ways for engineers to do more with the resources of their networked workgroup than simply passing files from one machine to another. Their goals were similar, but the approaches to distributed computing were different. HP provided more services and tools for system administrators and end users while Apollo focused on providing a better development environment for programmers.

However, not all the pieces are in place yet. In the coming months, most of the Apollo products will be available on HP workstations and servers. By late spring, NCS (Network Com-

puting System) will run on HP 9000 Series 300 and 800 workstations and servers. Task Broker, the key HP contribution to Team Computing, has recently become available on Apollo workstations and DN10000 servers. The next step in the teamwork between the Fort Collins Workstation Division and the Apollo Division will be to integrate Task Broker into NCS.



Another way to define Team Computing is a team of computers working together across a network as if they were one very powerful computer. Products such as Network License Server (NLS) for software licenses administered over a network, OmniBack for doing network-wide unattended backup, and Net Dist for network-wide operating system updates make computers work as teams.

Last but not least, Team Computing enables people to work together more effectively because routine tasks have been automated. Team Computing has the potential to help people be more productive both as individual team members and as a team. Too much of an engineer's day is spent doing routine tasks such as backing up files, gaining access to various machines on the network, updating the database and retrieving files from storage. Various Team Computing products automate these tasks.

Task Broker and NCS have capabilities that can help project teams in client/server networks be more productive and share project information more effectively. NCS partitions applications and can send the compute-intensive parts to work on the fastest CPUs. Task Broker can make big jobs such as simulations in SPICE get done sooner by allowing them to run on the best available machine. These distributed computing tools make it possible and easier for engineers to work together to review designs. People working together get transparent access to one another's data, and they can transmit documentation electronically.

Team Basics

NCS AND THE X WINDOWS SYSTEM are the two enabling technologies that form the basis for Team Computing across hardware platforms. Software products such as NLS and OmniBack run on top of NCS. In order for a workgroup to use distributed applications, NCS object code must reside on both the clients and the servers.

NCS is a development environment for programmers who are writing distributed applications. Programmers can write for the system that they know and can use that environment to make a remote procedure call to another system. A client and a server pass parameters to procedures across a network using NCS. To the programmer it appears as if the whole application runs on the local CPU because NCS hides the complexity of the remote system.

In order to partition an application, the programmer must decide what information the client needs to send to the server and then create an Interface Definition Language File to specify the interface definition and define what services are needed. The two most common uses for NCS are to segment compute-intensive applications so that the computation goes out to a server and to access a remote database from a workstation.

The X Windows system is another foundation of Team Computing. X provides tools for a common user interface so that applications can have the same look and feel across platforms. If users had to learn a new user interface for every platform on the network, time and money spent on training would offset the productivity gains from distributed computing.

The remote display capability, a standard feature of X.11, is another reason that X works well in a distributed environment. X provides a networked environment that can run remotely across servers, X terminals, workstations and even instrument controllers that run an X Windows version of Rocky Mountain BASIC.

A Functional View Of Team Computing

When it comes to Team Computing, HP uses the word *product* loosely. Between the Workstation Group and the Apollo Division, there are no standard Team Computing products. You won't find some of the products they talk about on price lists. A product list from the Workstation Group includes Passwd Etc. and Distributed Debugger (parts of Apollo's Domain OS not sold separately from the operating system) and Net Dist, a feature of HP-UX 7.0. The company has not yet disclosed how it will incorporate those Team Computing "products" that currently come bundled as part of operating systems on either platform.

Team Computing is better understood as a set of capabilities and potentials rather than as a group of products. You get a clearer picture of what Team Computing means when you

consider the functions that a workgroup performs and consider how the hardware, applications software and enhanced features of the operating system work together to make networked workgroups more powerful than standalone workstations.

Here are some of the benefits that Team Computing provides to engineering workgroups:

- Decrease the compute time needed to get jobs done.
- Speed up the ramp uptime required for new systems.
- Distribute software and documentation efficiently.
- Automate systems administration functions.

Speedier Processing

A FEW YEARS AGO WHEN HP and Apollo were competitors rather than collaborators, both companies needed a way to channel the idle mips in a network to get more throughput. At HP, circuit designers at divisions had Series 300 workstations on their desks and Series 800 minicomputers as servers. They needed faster processing for simulations and routings capability. (See TASK BROKER_AN INTERNAL TOOL TURNED PRODUCT.)

At Apollo, the need for speed was customer-driven. Many Apollo customers used workstations networked to other, more powerful computers and needed to harness the resources of the most powerful CPUs on the network for compute-intensive applications.

Task Broker and NCS are two different approaches to the problem of providing users with more processing power and letting them control this power at their workstations. HP's Task Broker was designed to be implemented by users and systems administrators while NCS is a programmer's tool. Task Broker makes better use of resources through a bidding process that locates the best available CPU for a task. NCS allows for resource sharing at the application rather than at the CPU level.

Programming is required to partition an application between a "client" program, or subroutine, that needs computing resources and a "server" program, or subroutine, that provides them. NCS modifies an application's source code in order to

[Task Broker — An Internal Tool Turned Product]

Task Broker, HP's distributed computing application, began as an internal tool at an integrated circuit lab. The CAD group at this lab typically ran large simulations and needed to offload the processing to servers because these jobs took so long to execute on CAD workstations. Engineers tried to solve the problem by writing shell scripts and working at odd hours to get their simulations run.

Software developer Gary Thunquist was assigned to this group to provide tools so that the engineers could concentrate on designing circuits.

In 1986, Thunquist searched for an application that would offload workstation processing to servers, found no suitable tool and ended up writing a program first known as Queueless and now sold as Task Broker. Eighteen HP divisions already were using this productivity tool when it became available as an HP-UX product last fall.

Thunquist found that the biggest drawback in client/server computing was that clients and available servers were not able to find one another. As a result, client applications were queued at one machine while another stood idle because the client/server model of computing lacked an ordering mechanism. He concluded that what was needed was a way for clients to say what tasks they needed a server to do without specifying where the job would be done. Queueless uses an arbitration mechanism at both ends instead of an ordering mechanism at the server end to assign tasks to machines.

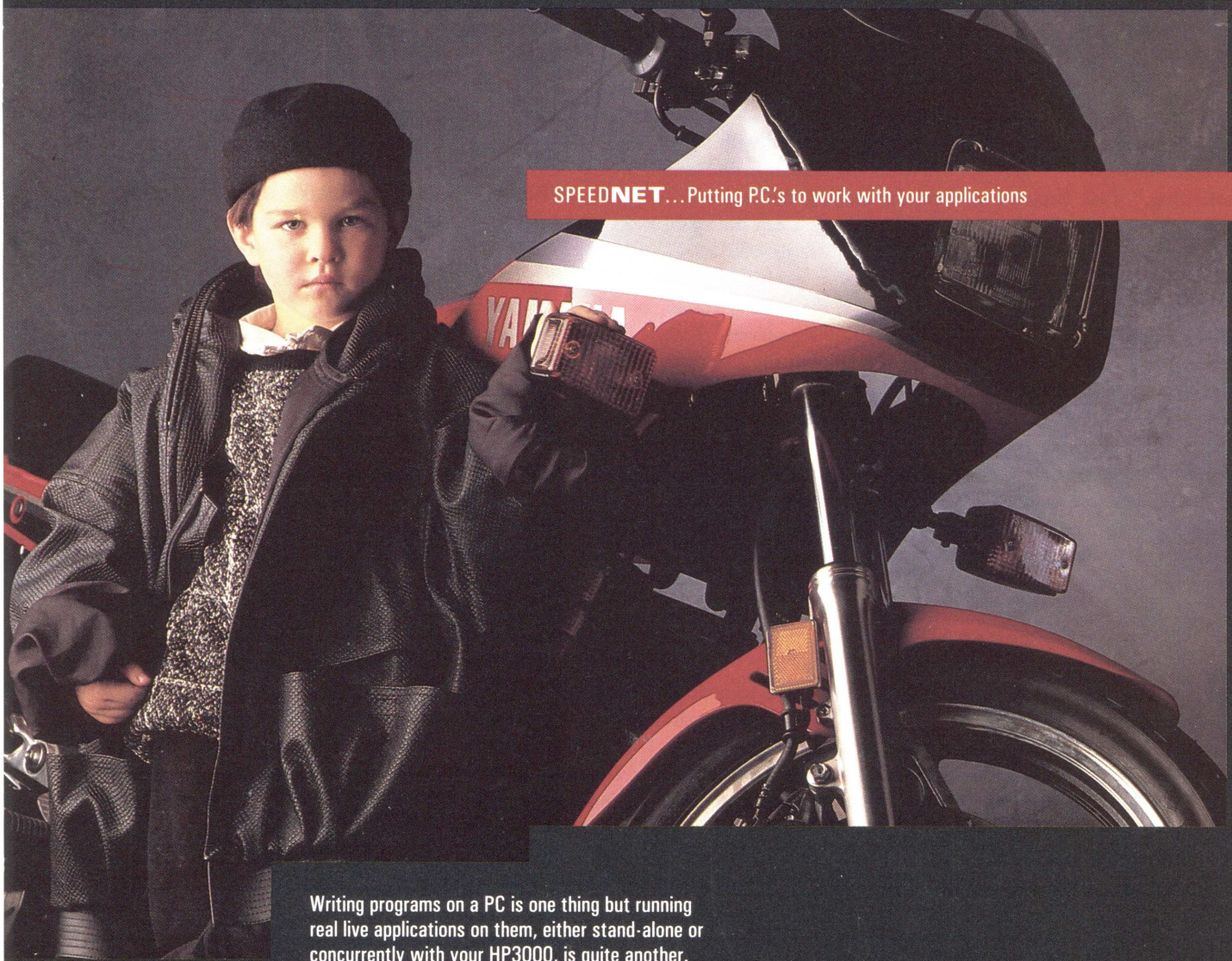
A queue is static, but the bidding process for finding the optimal server is dynamic because network resources change as jobs get completed. Each time a client has a job, the bidding finds the *optimal* server. The optimal server is not always the biggest machine — it's the one with the most idle processing power available.

A visit to one of HP's IC labs provided a chance to see Task Broker in action. The workgroup includes about 25 workstations and five Series 800 multiuser machines as servers. This group uses HP's ChipBuster to do behavioral simulations on very large designs. Each engineer has a portion of the model to verify. The system administrator can choose which machines to use for the simulations and which to exclude from bidding. He also can specify the maximum load on the system; for example, it's possible to define a big job and then to set a limit to the number of big jobs that can run simultaneously.

Before the lab used Task Broker, engineers had to coordinate who would run simulations when, and which machines would be used. Now they simply request a simulation without having to consider where it will be processed. Task Broker made it possible to get more throughput without adding more hardware to the network. Because it takes less time to get simulations done, designers can now do more of them before their designs go into silicon. The extra iterations make it possible for designers to tweak the parameters so that their chip designs get denser routings.

—Peggy King

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partition it. However, no source code modification is required for the bidding process in Task Broker that finds the fastest available CPU on the network.

What's Available Now: Task Broker is the only Team Computing software product that HP-UX customers can purchase. This month HP began to ship Task Broker for Apollo workstations. NCS is expected to be available for HP-UX workstations by the second quarter of 1990.

What's to Come: Task Broker will be integrated with NCS. When the two are integrated, NCS users will benefit from "load balancing," Task Broker's method for picking the best available server. Currently, NCS finds all servers that can do a job, but there is no mechanism that automates the process of selecting a server.

When Task Broker runs on top of NCS, the NCS Location Broker will provide a better means of polling servers. Task Broker interrupts processes to locate servers, but the Location Broker component of NCS can determine at run time which servers are available without interrupting the processes. When the two products are integrated, programmers will be able to partition an application for "cooperate mode," a kind of parallel processing with multiple machines instead of multiple CPUs. Task Broker's accounting feature will keep track of what services each machine is providing.

Faster Startup

HP USES THE PHRASE "compressing time to action" to describe the benefits of NewWave Office, but the same concept applies to the new Instant Ignition program that became available last summer. The latest version incorporates OSF/Motif and became available with the release of HP-UX 7.0.

Randy Branson, HP Workstation Division product manager, estimates that having a preconfigured disk saves up to four hours loading time. Loading and configuring the X Windows system is even more time consuming. Branson estimates that a person unfamiliar with X could spend up to 40 hours on the task.

Ready availability of software applications is another time-saver. NLS makes it possible to use a "wounded" demonstration copy of an application, decide to purchase it, and activate the license for it by notifying the vendor.

What's Available: The Instant Ignition option is available on HP 9000 Series 800 and Series 300 systems for no extra charge.

NLS is available on Apollo and will be available on Sun and DEC workstations when NCS starts shipping on these platforms sometime this spring. The Apollo Division has yet to announce third-party software vendors who have agreed to use NLS to distribute their license agreements.

What's to Come: Look for Instant Ignition as an option for Apollo workstations soon after the Apollo Division begins shipping with the OSF/Motif user environment.

Expect to see a trickle of software available for trial runs using NLS. The first applications are likely to be HP/Apollo software products and applications from lesser known companies. NLS was the first proportional licensing scheme, but there are competing products. For example, both Framemaker from Frame Technology and Software through Pictures from IDE run under X Windows and have a distributed licensing policy for workgroups, but neither of them use NLS.

New Ways To Distribute Software And Documentation

WHEN YOU MULTIPLY THE AMOUNT of time it takes to update a system's operating system and documentation times the number of machines in the workgroup, it's no wonder that most system administrators dread moving to the next release of anything. HP's new technology for distributing product documentation and software over a network makes these tasks manageable.

What's Available Now: The Net Dist feature of HP-UX Release 7.0 allows a systems administrator to designate one machine as the source server that can update all other CPUs on the network. On the Apollo side, NLS supports easy upgrade of application software licenses.

If you have a spare PC and a half-height CD-ROM drive, you can get documentation updates with a subscription to HP LaserROM/UX. There is a LaserROM/LAN product for distributing documentation over a network, but it runs OfficeShare-LAN, a product not often used in engineering workgroups.

What's to Come: The Net Dist feature of HP-UX won't become available to Apollo users until the two operating systems converge. HP LaserROM/UX would be more useful to distributed environments if it ran on a TCP/IP network, but HP has yet to announce a version of LaserROM/LAN that is supported on LANs other than its own OfficeShare.

HP has announced plans to offer NLS for Series 300 and 800 workstations, but no availability date has been projected.

Automated Housekeeping

FREQUENTLY, ENGINEERS PERFORM TASKS that usually are left to systems administrators in other computing environments. OmniBack and Passwd Etc. are two applications that automate some of the housekeeping functions that take time from engineers' productive work.

OmniBack is an automatic file backup system designed for large distributed mulitvendor networks. It automates all the work involved with backups, setting up when they happen, performing them, and keeping an online record of them. Not having to think about backups means fewer administrative tasks for an engineer to do.

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Using OmniBack, a system administrator or an engineer sitting at any node on the network can back up and restore selected disks on the network and can save and then restore them from any storage device on the network. The backups can be scheduled at different times of the day and the week and at varying frequencies to tailor them to each engineer's work times.

It's also possible to select files and directories to be included or excluded in the backups. A single file contains the definition for the backup schedule and a single command initiates the backup. Because OmniBack is built on NCS, the application can back up multiple CPUs concurrently.

Passwd Etc. is a feature of Apollo's Domain operating system that works with NCS. The system issues each user a unique identifier from a centralized database that maintains person, group, organzation and account information. The central repository in Passwd Etc. also provides user account management information that can be accessed from any machine on the network. This feature of the operating system was designed to insure the accuracy and consistency of user account information on a network. A centralized password system provides a single authentication scheme so that engineers spend less time gaining access to various systems on the network and have only one password to remember. This system makes it easier for system administrators to provide security on a network because any changes to user authentication are immediately propagated to every machine on the network.

Resource monitoring is another system administration task that is automated in the Team Computing environment. Flexible licensing mechanisms such as Apollo's NLS allow a workgroup to pay for a set number of nodes in a distributed computing environment. NLS has reporting tools that monitor and track usage levels to help systems administrators determine whether more software licenses are needed.

With Instant Ignition, both end users and system administrators can learn more about their networked system and how it's being used. A reporting feature called SPUskan keeps a record of the exact hardware configuration. This feature is especially useful when you need to request service from HP.

The preconfigured X Window logon screen features the X Line Icon, a resource utilization display program that runs in a window and displays graphs for CPU, LAN and memory utilization. Task Broker users who want to find out which machines are processing their jobs can view the CPU graph.

What's Available Now: If you have Apollos running under NCS, Passwd Etc. is available to you as a feature of Domain/OS operating system. OmniBack is a separately priced product. If you buy a new HP-UX workstation and opt for Instant Ignition at no extra charge, you get both the SPUskan capability and the X Line Icon.

What's to Come: When the HP version of NCS becomes available, HP versions of NCS-based Team Computing "products" will follow. Expect to see Passwd Etc. and OmniBack available on HP 9000 systems running HP-UX toward the end of the year. HP also plans to offer these products on UNIX workstations from DEC and Sun.

No news yet from the Apollo Division about whether Passwd Etc. will be sold as a software product or be incorporated as a feature of HP-UX.

The next enhancement of Instant Ignition's preconfigured X Window environment will include a version of SPUskan that monitors both the hardware and the software configuration across the network.

Because the X Line Icon and SPUskan are both features of Instant Ignition, they won't be available until this option is offered on Apollo workstations.

Too Soon To Tell

Will Team Computing become a seamlessly integrated mix of operating systems, services and software that helps end users, systems administrators and programmers increase their productivity? Or will the team end up being a group of players that can't work together? It's too soon to tell.

The success of Team Computing depends on HP's ability to get distributed networking products on both platforms as quickly as possible and to market them effectively. But it also depends on a couple of outside factors as well. One of these factors is to what extent Apollo's partners and HP's VABs support the program. A distributed computing environment is of little use if the applications that users want aren't readily accessible over the network. HP may need to support licensing schemes in addition to NLS to insure that the most application are available. In January, the UniForum Conference (Washington DC), some software vendors announced that "wounded" versions of their applications would be included on the Instant Ignition tape. Are there others to follow?

The fate of Team Computing is also linked with the acceptance of NCS, whose future is in OSF's (Open Software Foundation) hands. The DEcorum proposal submitted by the Apollo Division, IBM, Locus Computing and Transarc calls for the remote procedure calls in NCS to become part of the standard operating system for distributed processing. If this proposal is accepted, NCS will become part of the OSF/1 operating system.

If remote procedure calls become part of OSF's standard user environment, expect many of the 150 companies who licensed NCS to bring out systems and software that work in the distributed workgroup environment defined by HP/Apollo. If DEcorum becomes the standard for a Distributed Computing Environment, Team Computing will be the model for shared resources in engineering workgroups.

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NCS Is Taking Hold As An Industry Standard

THE RIGHT CONNECTION

[By Bill Sharp]

When HP acquired Apollo, a lot of fine hardware and highly respected engineers came alongwith the deal. One of the developments Apollo engineers devised is the Network Computing System (NCS) that allows specially written applications to send some of their toughest work to other computers on the network.

By placing NCS in the public domain, Apollo turned a fine product into an even finer marketing move. The result is a rapidly growing industry standard, continuing publicity for Apollo/Hewlett-Packard, with an attendant leg up for HP/Apollo networking products.

More than 200 firms have licenses to use NCS, including most of the large computer vendors and many customers. In both cases, the appeal seems to be the attractiveness of NCS as a vehicle for building heterogeneous networks that can stretch computing resources further while helping to make today's open systems more open than ever before.



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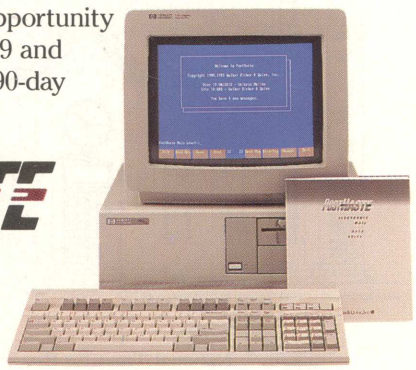
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HP knows a good idea when it sees one, and has built a larger program around NCS — HP Team Computing. The new program combines NCS with several products including:

- Task Broker — a simpler distributed computing application for end users who haven't the resources or application need for a full NCS system.
- NCS-based system administration applications.
- A preconfigured X Windows environment that uses the OSF/Motif GUI to provide the same appearance and behavior in HP and Apollo workstations and X terminals.

HP has plans to extend the work Apollo did with NCS and make it the basis for a family of networking products with the clout of an industry standard anchoring them. If all goes well in the next few months, this strategy will greatly improve HP's already good standing in the marketplace. NCS seems destined to become an important part of the computer industry.

What Is NCS?

TASK BROKER AND PARTICULARLY NCS are a bit complex, although they serve some of the same needs. The object of both systems is to provide a user with more computational power for a demanding task than they typically would have available, using the computing network to make that power available. In both cases, the systems make that computing power easier to access than it has been to date.

NCS and Task Broker are to computation what file servers are to data retrieval. Rather than simply moving data over the network, these systems use the network to improve the effective performance of your computer. The approach of the two systems is fundamentally different, and each is suited to a different type of task or application.

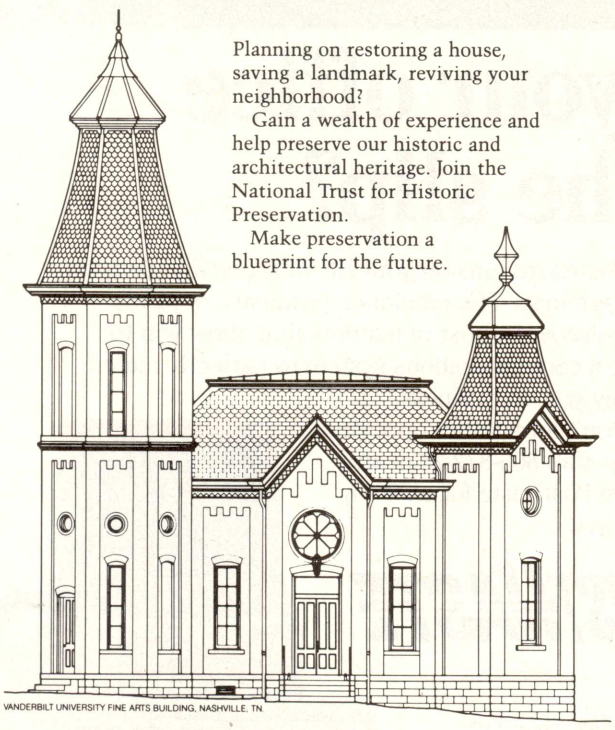
Task Broker is designed for use on a network by end users who need additional computation power for some applications, and who don't have access to the resources required to rewrite their applications. Task Broker can be used without modifying applications.

NCS is intended for use by application developers or by end users within organizations that can supply the help needed to rewrite applications to include NCS capability. NCS requires that the applications using it be rewritten to incorporate remote procedure calls into the software.

Computation executed at a remote site isn't entirely new. UNIX has had the capability for years in the form of remote logon, remote shell and remote execution.

"You can get a HILO simulation or a finite element procedure to run on a remote machine, but it takes some hard work,"

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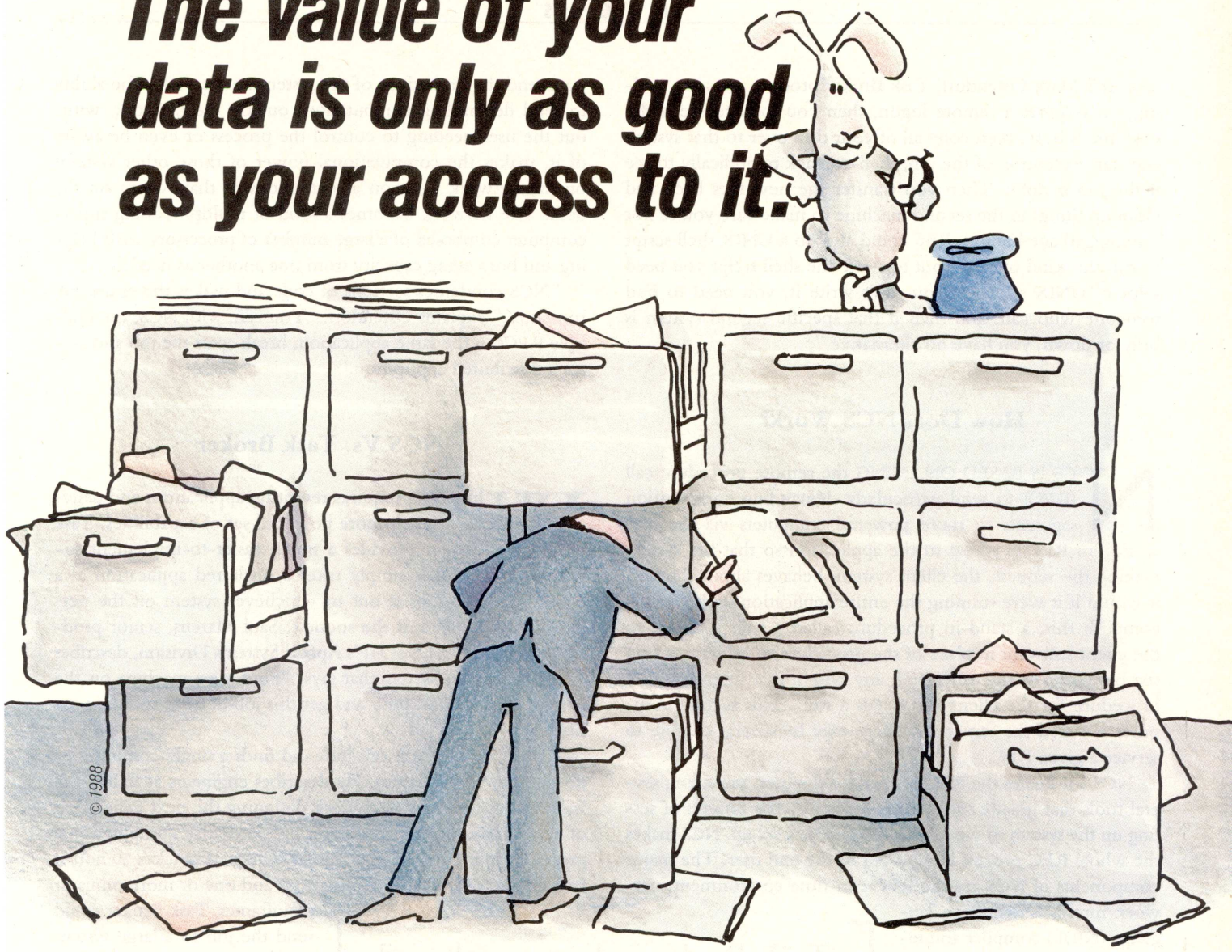
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[1] *"The Three Pillars of EIS" by David Friend, August 1988*
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says HP's Mark Ostendorf, Task Broker product manager, adding, "It requires a remote logon, then you look to see if the machine is busy, then copy all of your data over to that system and start execution of the job, then go back periodically to see if the job is done. Then you transfer the new files back and clean up things in the second machine to make sure you're not leaving garbage behind. You could also do a UNIX shell script to run this kind of a job, but to write the shell script you need a lot of UNIX savvy. If you can't write it, you need to find someone who can, and then if that specific second system is busy or down, you have no alternative."

How Does NCS Work?

NCS IS BASED ON USING the remote procedure call (RPC) to send particularly demanding computation segments to more powerful computers via the network. An RPC is added to the application so that the system making the request, the client system, behaves about the way it would if it were running the entire application itself. To accomplish this, a stand-in procedure called a stub is added to the client software in place of the procedure to be sent out on the network. At the other end, any system that might run the procedure for the client also needs a stub. This second computer is called the server and there may be several eligible to service a given RPC.

NCS automates the RPC process for the user, providing several tools that greatly speed up and simplify the process of setting up the system to work with RPCs. Once set up, NCS makes the whole RPC process transparent to the end user. The major components of NCS are the RPC run-time environment, network interface definition language (NIDL) compiler and location broker.

RPC run-time environment manages the packaging, transmission and reception of data in the RPC process. The NIDL compiler creates C-language source code for the RPC stubs on both ends of the process, and shields the application developer from the nitty-gritty details of the server system. Location broker determines at run time which potential servers have the requested service, eliminating the need for the end user to specify which system will service the RPC.

NCS-based applications make it possible for the user to transcend the limitations of the system on his desk. The ability to send demanding computations out on the network, without the user needing to control the process or even be aware of it, makes the computational power of those other systems on the network function as extensions of that system on the desk. The network becomes a kind of multiprocessing supercomputer composed of a large number of processors, each helping and borrowing capacity from one another as needed.

"NCS condenses sections of code and makes the entire job run faster," explains Ostendorf. "You can, with NCS, use multiple RPCs in the same application, break apart the job and create a distributed application."

NCS Vs. Task Broker

While NCS requires rewriting applications and delivers a much more powerful set of capabilities, Task Broker provides a much easier-to-implement solution. Task Broker simply takes a unaltered application as a whole unit and jobs it out to whichever system on the network will complete it the soonest. Saul Marcus, senior product manager for NCS at HP's Apollo Systems Division, describes Task Broker as a system that says, "Find me a machine on the network that is least busy and get this job done as soon as possible."

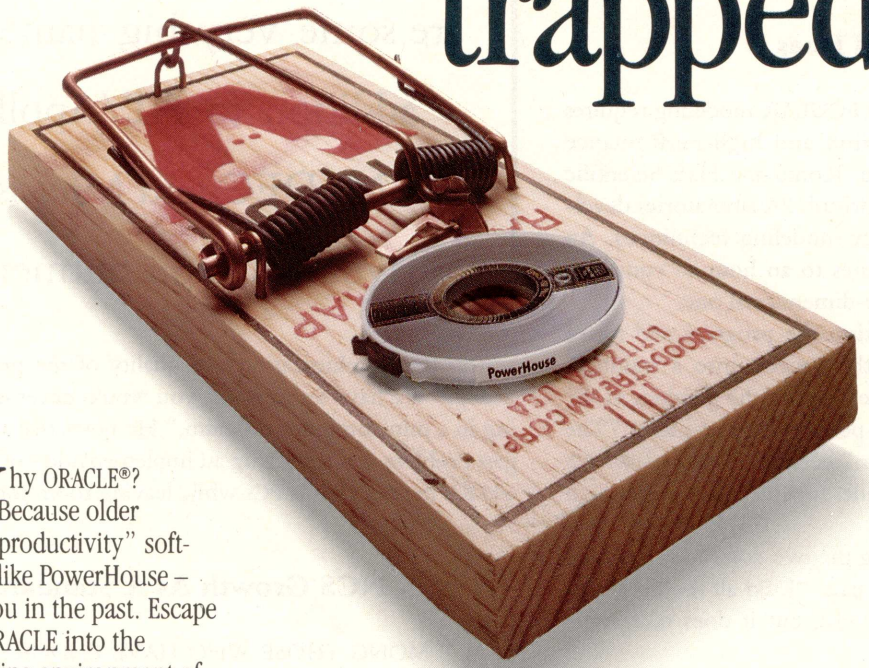
"Task Broker sends out bids and finds a single computer to do the job," says Marcus. He describes engineers at Italtel, the Italian phone company, at work designing the next generation of telecommunications circuitry. A particular computational process running on a single Apollo workstation takes 20 hours. In a network including workstations and one or more minis or mainframes, Task Broker could send the job to a large system and improve the run time.

> Task Broker takes a unaltered application as a whole unit and jobs it out to whichever system on the network will complete it the soonest. It says, "Find me a machine on the network that is least busy and get this job done..."

However, if the network included only workstations, Task Broker could do little to improve the speed because it has to send the entire job to one workstation. NCS, however, can divide the job between several workstations to get it done faster. Italtel did just this, using NCS to split the computation job into individual computation jobs for 10 workstations, and cut the 20-hour run time to 2 1/2 hours.

"There are two reasons for using NCS," adds Marcus. "One is for computation-in-

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MD	Baltimore	Mar 29*f*#
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MI	Dearborn	Apr 10*c*
MN	Minneapolis	Mar 6*fp* Apr 3*c*
MO	Kansas City	Mar 21*c* Apr 27*l*
	St. Louis	Mar 13*f* Apr 5* Apr 11*c*
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	Res Tri Park	Mar 15
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tensive jobs where you send sections of the job to more powerful computers. The other is where you have a centralized database and have users inquiring to that central point. Even if you have small network like a Cray and one workstation, it might make a lot of sense to implement NCS, and there are people doing it. It depends on the application and how much you would benefit from NCS."

Rohm And Haas

COMPUTER-BASED MOLECULAR modeling requires both grueling computation and high-performance graphics. Tom Cozzolino, Rohm and Haas Scientific Programmer, works at the firm's Bristol, PA laboratories developing ways to improve computer modeling techniques. An Apollo 3000 system took 10 minutes to an hour to convert a two-dimensional model to a three-dimensional one.

Cozzolino used NCS to partition the program and move computation-intensive parts of the process into a number-crunching Alliant computer, while keeping the graphics in the Apollo system designed for high-performance graphics. "The application now runs 90 times faster," he says. "That's what NCS is all about — glueing good machines together to do what each does best."

Cozzolino notes that debugging the two computers running a the same time was the toughest part. "I did all the programming myself. It doesn't take a genius, but it does take some time and patience."

Wearguard Inc.

WEARGUARD, (NORWALL, MA) USES A NETWORK of Prime computers networked with PCs running applications written in C-language. Until recently, order entry and customer service programs ran only on the Prime computers, but these systems were overloaded by company growth. Additionally, software running on the Prime minicomputers was not as user-friendly as PC-based software can be.

Now, each of the three applications using NCS on the Prime/PC network makes from 10 to 30 remote procedure calls to quickly pull needed customer files from the minicomputers into the PCs to guide employees during phone calls and record new information.

Charles Seelig, vice president of MIS at Wearguard, realized that NCS provided "a far better platform than the minis for coding interactive applications. Minis are not good at pushing cursors around on the screen. Our applications are now easy to learn and use," he says.

Wearguard used the capabilities of NCS not so much to improve the speed of operation for their applications, but to add to the "sophistication and quality of the programs," says Seelig. "We have features that you would never dream of placing in a minicomputer program." He notes that the firm's biggest problem was squeezing an implementation of NCS into the 640 KB memory of its PCs while leaving room for applications.

Those who have endorsed NCS as a standard and have committed publicly to using it are some very big names. In addition to HP/Apollo, IBM, DEC and Microsoft have made commitments.

NCS Growth As A Standard

AMONG THOSE WHO HAVE ENDORSED NCS as a standard and have committed publicly to using it are some very big names. In addition to HP and Apollo, IBM, DEC and Microsoft have made commitments. UNIX International appears to have recommended that AT&T, its "parent" organization, also throw its support behind NCS. This spring, OSF is expected to announce its choice for a remote procedure call.

Saul Marcus of HP's Apollo Systems Division admits that predicting OSF's behavior is hard to do, but he's hopeful that the group will choose NCS, effectively crowning it as the industry standard. "If OSF announces that they choose NCS that should settle it," he says.

Good things seem to be ahead for NCS as ideas percolate. Rohm and Haas' Cozzolino conjectures that more can be done by further developing NCS in specific applications. "When you think about using NCS in conjunction with X Windows and a lot of other tools, we clearly are at the beginning of a lot more integration. People need to be able to glue together multivendor networks, including such things as multivendor printing services. There's no question in my mind that this can be done now."

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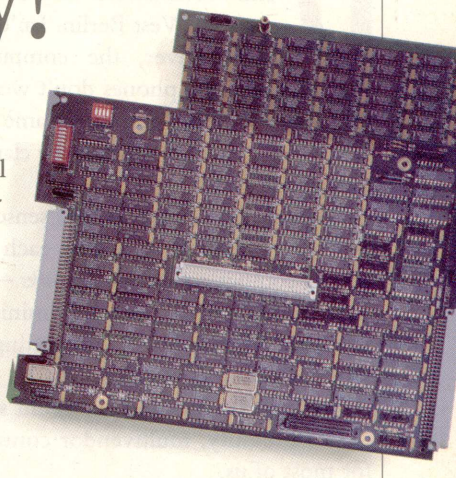
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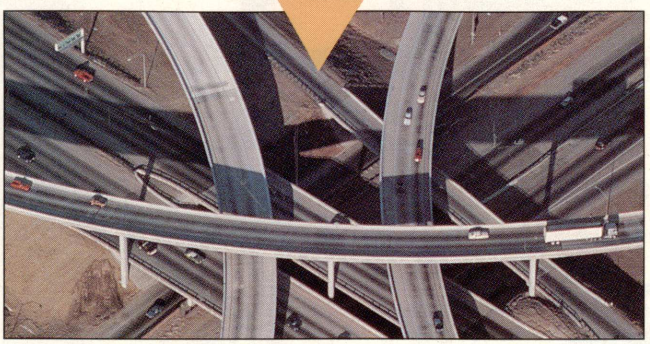
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The Revolution In Networkland

Getting A Multivendor Network To Work

Democracy in computing: That's what the PC revolution is all about. Through the 80s, we snatched up PCs and workstations like East Germans on a shopping spree in West Berlin. Isn't it wonderful?

However, the computing countryside is in a shambles, and the phones don't work. But before the dust can settle — with mini and mainframe computer sales circling the drain — our favorite vendors are clamoring about the next revolution: networks!

Doesn't it all make perfect sense? Why wouldn't you want all your computers to talk to each other? We've seen the future of computing and it's *networks* — networked PCs and workstations that will do the job of minicomputers and mainframes.

What's the problem? Try getting a multivendor network to work. That's the problem.

Despite the hue and cry about standards, particularly in the HP community, multivendor connectivity is still just a dream for most of us.

Luckily, definite trends are emerging that should help your planning. Network planning still isn't simple, but here are some suggestions for steering a clear path through a maze of standards and a haze of vendor fog.

[BY GORDON MCLACHLAN]

Learn The Terrain

FIRST, YOU NEED TO get your bearings. Different types of systems come with their own sets of problems and potential solutions. Very few of your networking choices will be clear cut and you'll have to make many performance, cost and compatibility trade-offs. You can make informed decisions only if you know what the issues are.

Networks aren't those cute little clouds, boxes and zigzags that illustrate the brochures. In real life, those boxes are PCs with DOS, PCs with OS/2, UNIX workstations and PCs, UNIX-like workstations, various mainframes and minicomputers. The clouds and zigzags represent more proprietary, standard, draft standard, and "industry" standard network options than you can shake a stick at.

If you rely on your vendors to keep you educated, you're dead.

What must you know to use Adager?

- **The database objects that Adager handles:** capacities, chains, databases, fields, items, paths, securities, sort features

- **The actions that Adager can perform on these objects:** add, audit, change, copy, create, decompile, delete, erase, fix, move, reblock, rename, repack, report, shuffle.

Adager guides you through the pros and cons of specific actions applied to specific objects in a specific database and validates your specifications as you enter them. Adager will not let you violate any IMAGE rules. Should you run into trouble, Adager assists you on the spot. (For example, if you want to add a path to a detail and you have forgotten to add the search field, Adager will invoke FieldAdd recursively within the PathAdd function.)

Adager's command interpreter accepts almost anything. If your computer background requires, you can communicate with Adager in your own cryptic ways, but you don't have to learn a new computer lingo. (For instance, if you want to audit a path to see if it has broken chains, you can say *audit path* or *path audit* or *p au.* Of course, you cannot say *p a* because this could mean *path add!)* All one-word commands that were included in the first Adager release (1978) are acceptable to Adager's latest versions *(ChainFix,* for example).

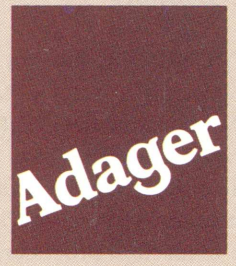
How do you run Adager, depending on your expertise?

- **In session, NOVICE mode (the default):** This is a nice interactive interface for your first Adager experiences (or whenever you need a refresher). As a bonus, you may request an Adager OnLine tutorial on IMAGE/3000, TurboIMAGE or TurboIMAGE/XL, selected by Adager according to your environment.

- **In session, EXPERT mode (run Adager with "parm 1"):** This is a more direct approach to the task at hand, without the social graces.

- **In session, to build a StreamFile (run Adager with "parm 8"):** This is much more convenient than *blindly* using an editor to create a StreamFile, since Adager makes sure that your answers are correct. For documentation, you may choose to *automatically* include the Adager prompts as comments within the StreamFile itself.

- **In batch (simply submit a StreamFile via the ":stream" command in MPE/V or MPE/XL):** A non-interactive approach, convenient for repetitive tasks or when you are logged on remotely and you don't want to have your task aborted due to a bad telephone line. For convenience, you should build the StreamFile in session mode with "parm=8" (see above).



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They know what they sell, and they don't sell what you want. You're on your own out there.

Multivendor networks are still no-man's land. Everyone wants the holy grail, but you're alone on your quest. The vendors have their own crusade.

Think Strategically

EVERYWHERE YOU LOOK, THERE'S a problem crying out for a network solution. If your company has been adventurous, you've already put in a lot of networks. Now you have to get them to work together.

Networks are nothing new. What is new is the emerging emphasis on generalized, multipurpose networks — which emphasize interoperability — rather than the specialized networks of the past.

In the good old days, if you had a communications itch, you scratched it. What you scratched it with depended on your vendor loyalty and your need for adventure and excitement. Now it itches all over and the old way doesn't work so well anymore.

With increasing frequency, enterprise-critical applications are being spun off of centralized mainframe and minicomputer systems to workstation networks. This may be done for reasons of cost, system performance or the availability of applications software. Whatever the reason, in the 1990s, connectivity often will be the choke point in your systems development.

Networks are critical in the new order. If you don't have the network infrastructure to back you up, you won't be putting in the systems your users want. Ferraris don't run in the mud.

You need a strategy. Actually, you need two strategies: yours and your vendor's.

Know And Love Your Vendors

EVERY COMPUTER SYSTEM MANUFACTURER has its own vision of your glorious computing future. You aren't just buying their boxes any more. Those are becoming commodities, especially on the PC and workstation side. You're also buying a corporate philosophy. You have to know what that philosophy is and decide whether it fits your own thinking.

If you find a decent fit, stick with your vendor. There will be ups and downs, and sometimes their products will be later than or inferior to some other vendors', but if you're working with a viable firm, they'll also do things right and give you some good tools.

The advantage you give yourself by staying within a product line, particularly with network equipment, is an increased chance of long-term compatibility and a migration path.

Of course, one vendor may not be able to meet all of your needs all of the time, and multivendor networks are probably unavoidable. Just show some restraint.

Jumping vendors may be a good way to get some price breaks and an occasional nifty new product and provide you with "leverage" you can wield like a baseball bat, but it isn't going to make your networks run any better.

Think Standards

HEWLETT-PACKARD HAS GONE "standard" on us. UNIX, OS/2, LAN Manager, Presentation Manager, Open System Foundation, XWindows, OSI/ISO, X.25, IEEE 802.3, EISA. That's nice. As an HP customer, you'd better understand what being "standard" means to you.

On the surface, standards look great. Modern industrial society depends on standards — nuts and bolts that fit. It makes sense. It seems that standards also ought to benefit the computer industry. Machines that can talk to each other. That certainly makes sense.

Unfortunately, the pace of technological change is too rapid for standards to keep up with, and vendor one-upmanship is a permanent feature of the marketplace. Vendors are sorely tempted to launch proprietary products that are positioned against standards, or to jump the gun on standards at the draft stage. Either way, they bring out incompatible products.

Take the current IEEE 802.3 10BaseT effort. The formal proposal for the 10 megabit/second twisted-pair Ethernet standard should be completed by the end of 1990. In the meantime, over a dozen network schemes "based on" the draft standard — including HP's StarLAN 10 — are already available.

Is there now an "industry standard" 10BaseT standard? Do any of these LANs work together? Will they work with equipment that conforms with the final standard?

Despite these problems, you can't ignore standards. They'll eventually lead to your salvation. Just keep your eyes open and watch the industry. The standards that count are those the industry uses. When the vendors get excited and start jumping the gun, that means there's something worth watching. There's safety in numbers.

Follow The Leaders

BIG BLUE IS BETTING THE WHOLE farm on its Systems Application Architecture (SAA) and OS/2. For all intents and purposes, IBM has abandoned UNIX in favor of SAA, OS/2 and its proprietary operating systems.

IBM's product plans are often contradictory and confusing, but this much is clear: LAN workstations now are officially real computers, the big hummers are transaction processors, minicomputers are database servers and application programming

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interfaces and user interfaces are supposed to be consistent up and down the product line. That sounds a lot like the systems and network architectures coming out of HP and other manufacturers.

If for no other reason than IBM's blessing, OS/2 with its LAN Manager, Presentation Manager and SQL Server technology will be the platform for a lot of slick networked systems. As an added bonus, it also seems to work decently.

Only time will tell, but HP already has bought into OS/2 in a big way by licensing the LAN Manager and Presentation Manager software for its UNIX platforms. Eventually, other UNIX systems will have to follow suit.

It doesn't matter whether you're tied to IBM mainframes or refuse even to learn how to spell SAA. You must understand how your networking strategy is going to be affected: Your servers will run LAN Manager and your databases will have SQL front-ends and servers.

The ISO/OSI Reference Model

THE INTERNATIONAL STANDARDS Organization's Open Systems Interconnection reference model (ISO/OSI) is the standard to end all standards. Wall-to-wall compatibility and ethereal happiness in Networkland.

The seven layers of the reference model define network services all the way from the electrical interface at layer 1 to the system services at the highest level.

ISO/OSI is significant because it gives vendors a framework within which to develop their network architectures, and it eventually will provide a standard method of delivering many classes of network host services.

It may never be a complete set of standards because the higher levels of the model are very system and application specific. There are going to be a number of alternative standards proposed for different applications. The Manufacturing Automation Protocol (MAP) is one example, as are efforts by the banking industry, international airlines and European governments to define standards for some narrowly defined applications.

Hammering out OSI won't be a quick process, and the standards that fit within the model will continue to change as technology marches onward. Integrated Services Digital Networks (ISDN) and fiber-optic distributed data interface (FDDI) are two examples, and the work on high-level applications standards has just begun. The standards that comprise the OSI model will never be frozen, nor should they be.

Except in narrowly defined applications, OSI may never deliver full compatibility between systems, but it will make things a lot easier than they are now. It will be worth the wait.

In the meantime, make the most of what we have. Use X.25 and the IEEE 802 standards that already have been defined for OSI. That is at least a firm foundation. Above that level, you will have to fake it, perhaps with TCP/IP, until the good stuff comes out.

X.25 is the standard wide-area network protocol for ISO/OSI. It is widely accepted, especially in Europe, where it is the standard for the various national postal, telephone and telegraph authorities, and it works. Even IBM supports X.25 under SNA, if grudgingly, expensively and incompletely.

If you have an IBM SNA network, you may still wind up adding gateways into your network to keep your existing IBM connections, but you can count on X.25 being in your future.

IEEE 802.3 (ETHERNET) is a standard. IBM admits that Ethernet exists, and the OS/2 LAN Manager supports it. HP refuses to admit that Token-Ring exists. It's not standard. If you're a good HP customer, and if you want to tread the standards path, buy Ethernet.

Of course, running coax all over the place in a large installation is nonsense. The costs of cabling and the hassle of troubleshooting coax networks dictate using twisted-pair wiring; the same stuff your telephones use.

Unfortunately, the IEEE 802.3 10BaseT for 10 mbps Ethernet still isn't complete. You decide what to do. HP says to buy the non-standard Ethernet, rather than the non-standard Token-Ring. It's more standard.

Plan B - Using TCP/IP

IF THINGS ARE DESPERATE, YOU can't wait for standards to fall from heaven. You've got to move some data now. That means resorting to plan B: TCP/IP.

TCP/IP has two advantages over other networks. It works and it's everywhere. It offers only basic services — character-mode terminal pass-through, file transfer and a simple electronic mail system — but it will do the job while you're waiting for your favorite standard network vaporware to solidify.

Almost universal in UNIX networks, TCP/IP has been migrated to many hardware and operating system platforms, including IBM, HP, DEC systems and many PC networks. TCP/IP originally was used by the Department of Defense, which pushed it as the standard for the DoD's Advanced Research Projects Agency Network (ARPANET).

Putting in TCP/IP seems to be what everybody is doing while they wait for OSI. Just remember, when the good stuff comes out, you'll throw away TCP/IP. Even the people who sell it to you will admit it. TCP/IP isn't the technology that will take you into the 21st century, but it might keep you employed in the 1990s.

THE TIMING OF NETWORK STANDARDS and your favorite vendor's products will rarely coincide with your requirements.

If your needs are modest, your users are patient and everything is happy, just count your blessings and wait. The hard-

ware will get cheaper, the software will work better and things will be more compatible. You won't bleed nearly as much.

On the other hand, don't retire to the mountain top to await your salvation by standards. Inaction may give you more headaches than your incompatibility problems will. If you keep your eyes open and don't buy the vendor hype at face value, you should do just fine.

Before you buy something as a quick fix, think about how you're going to get rid of it, or integrate it into your strategy before it becomes a choke point. Short-term solutions are fine, but expensive short-term solutions tend to become permanent.

Use Short-Term Solutions For The Short-Term

A LOT OF SPECIAL-PURPOSE HARDWARE and software has made its appearance to solve your network problems. You've probably bought some of it already. Most of it works OK, and some of it works great. For now.

Protocol converters, network engines, terminal emulators, file transfer software and proprietary LANs can take away the pain of some of your current problems. They don't solve the problem and won't give you compatibility with the standard networks of the future.

Quick fixes may be necessary, but make them fit your plan. Don't let your network strategy become the sum of your short-term solutions.

Don't Believe It Until You See It

ALL NETWORK EQUIPMENT IS INOPERABLE until proven interoperable. That's the rule. Don't confuse vendor statements with reality. If you need the Super Turbo OSI Cooperative Processing Ethernet Engine to implement your order processing system, don't make any big plans until it's in your hands. Better yet, wait for release 1.1 when it's really out of beta test.

Your vendor won't want the equipment of other vendors disturbing the color-coordinated ambience of its offices. If you really want to see that multivendor network running, you'll probably have to set up your own lab. Do it. Don't install anything in production until you've worked it over in your own torture chamber.

Technical Support Issues

WHILE YOUR VENDORS WANT to give you the capability for multivendor networks, they don't seem to want you to actually put one in.

When you have problems in a multivendor network, they're all yours, especially if you've done things that aren't approved of by your vendor, and you'll be amazed to find out what your vendors don't approve of.

The use of public packet-switched networks may take some of the support load off your staff, and HP offers some multivendor support contracts. See if these can help you.

Keep your network design as simple as possible. The more gateways, bridges, routers and other gizmos you have out there, the more problems you'll have, and the worse your response time will be.

Make network management tools part of your evaluation criteria. They're also beginning to be standardized, and HP should be taking a leading role with its Open View product. IBM's NetView also bears watching.

What About The Opposition Parties?

YOU'LL FIND THAT THE IDEA OF a standard network is very appealing to the populace. However, the provincial governors may like the status quo, and the military has its own ideas.

Do you have an IBM SNA network in your company? The planners for that probably don't want to hear about your master plan for converting them to X.25. They'll help you select some fine protocol converters and gateways to help you run on their standard.

How about PC networks? Half of the IBM PC LANs in existence are running some flavor of Novell's NetWare. It doesn't use anything resembling a standard network protocol, but it runs great. Getting rid of a Novell network is like trying to pull the plug on HAL. Bring OS/2 and your spacesuit.

Do you have some engineering workstations hanging around? At least you've got a chance there. They probably run some flavor of TCP/IP; unless you've got a VAXcluster with Novell server software...

Be prepared for it. Before you can get to a standard network, you are going to have to convince a lot of people why they should change their proprietary network strategy. To them, the proprietary approach is much more appealing. It already works.

Justifying The Move To Standards

IF YOU HAVE A CLEAN SLATE, a mission from God and a healthy budget, moving toward standards will be no more of a problem than most brain surgery. If there are skeptics in the crowd, you have some real work to do.

Nobody wants to keep the computers from talking to each other. That's not the issue. It's just that perspectives change depending on where you sit. You seem to be the one with the problem.

The SNA network works just fine for the IBM stuff. The PCs are happy in their LANs and the workstations are working. It's a pity your HP's response time is slow on the SNA network, and it's too bad you need a non-existent "standard" LAN. Why did you buy that stuff anyhow?

How will you break down this resistance? Start small. Build your lab. Get some things working, both to educate yourself and to show some results.

Train your analysts, not just your specialists. Your systems analysts and programmers will develop systems only with the tools they have at hand. If they don't know about your network plans or the capabilities of the new networks and databases, they can't factor them into their planning.

Let your applications strategy drive your network design. Don't let your network, or lack of one, force you into bad application designs, and don't try to justify a network without applications to back it up.

Plan Now

Don't wait until your back is to the wall. Plan your network and phase it in. A lot of short-cuts, extra expense and incompatibilities will result if you get on a crash program.

Show some cost savings. New networks are expensive. If you're going to spend money, show how you can save even more in the long run. Intangibles are fine, but money talks.

If your transaction volumes are low (in the 10- to 20-transactions-per-second realm) the cost of a LAN workstation-based system may be less than half the cost of a comparable minicomputer system. Show how networking makes it possible to save those dollars.

Public or private X.25 packet-switched networks may offer you significant cost savings over dedicated leased lines or dial-ups to a central site, even if you have to use gateways for protocol conversion. They also may improve your network management and reliability.

ISDN eventually will offer you tremendous opportunities for efficiency by allowing you to integrate your voice and data networks, and that interface will be standard and well supported.

The critics? Just stay in their faces. Sooner or later the lights will come on.

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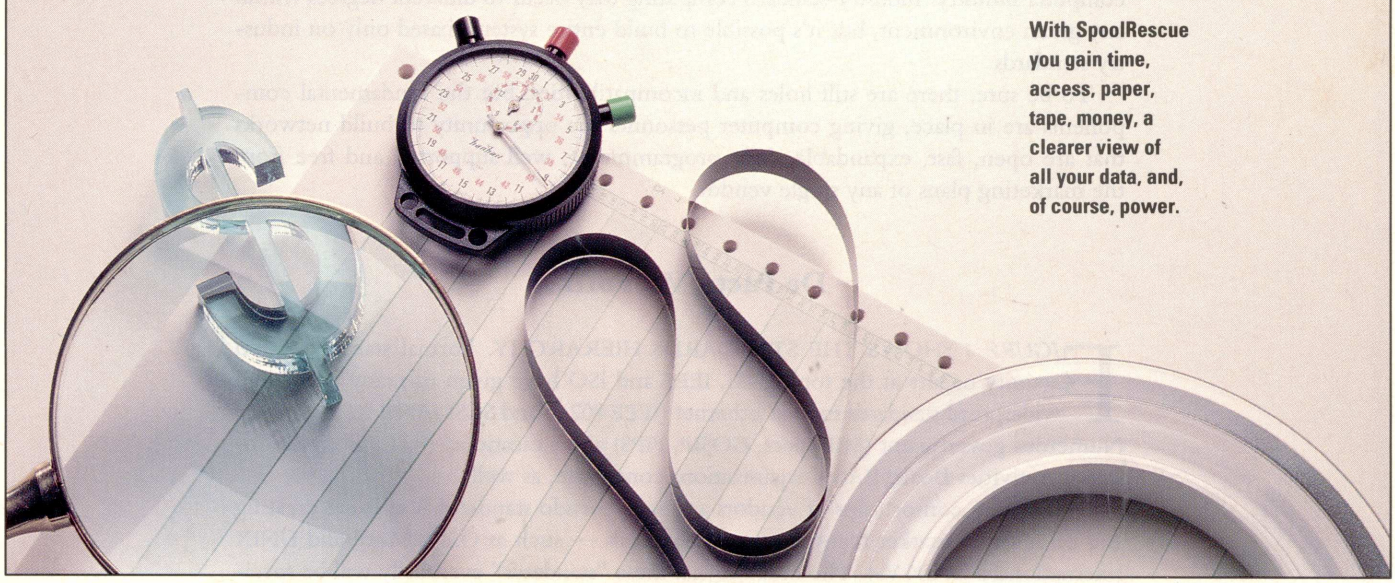
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RISC/UNIX, RPCs, SCSI And X Take The Computer Industry Toward Vendor-Independent Network Computers

Industry-Standard Computing

[By Bradford T. Harrison]

Industry-standard computing — that is, development of computing platforms that conform only to standards that exist independently of any single vendor — is the dominant force in today's computer industry. Industry-standard computing may occur to different degrees within any given environment, but it's possible to build entire systems based only on industry standards.

To be sure, there are still holes and incompatibilities, but the fundamental components are in place, giving computer personnel the opportunity to build networks that are open, fast, expandable, fully programmable, well supported and free from the marketing plans of any single vendor.

De Facto Vs. Formal

FIGURE 1 SHOWS THE STANDARDS HIERARCHY. Formal standardization activity occurs at the top. ANSI, IEEE and ISO have given us many useful and widespread standards such as Ethernet (IEEE 802.3) and SCSI (ANSI X3.131-1986). Numerous government (MIL specs, GOSIP, FIPS) and educational (RFCs from the Internet Activities Board [IAB]) organizations contribute, as well.

Below that, consortiums of vendors acting as pseudo standards bodies are creating and bringing to market many proposed standards — such as OSF's Motif and UNIX International's UNIX V.4. The intent is that these "standards" eventually will be specified formally by one of the bona fide standards organizations.

At the bottom of the hierarchy is where the least formal but often most meaningful standardization activity occurs — in the field, where real products from real vendors solve real problems. Here's where de facto standards are made, enabling customers to implement field-proven products to accomplish the goals required of their computing environments. At this level we find de facto standards such as Sun Microsystems' NFS and AT&T's UNIX. Many standards that are specified formally tomorrow (in one form or another) get their start here.

RISC/UNIX Leads The Way

SO FAR, STANDARDS GROWTH has been haphazard. The two standards at the heart of the industry-standard computing platform were developed with other goals in mind. UNIX, written by Ken Thompson and Dennis Ritchie at AT&T's think tank Bell Labs, was designed for use by programmers within that organization. After it was rewritten in the high-level C language, it became the industry's first portable operating system and thus made its way into many environments. AT&T collects licensing fees on every copy of UNIX sold, whatever the particular implementation, but that doesn't make UNIX any less a de facto standard.

RISC came into being because computer architects wanted to take full advantage of VLSI technology. The complexity of CISC architectures was just too great to fit onto small bits of silicon and simultaneously yield the performance gains we're just now beginning to see.

Interestingly, RISC's becoming an industry-standard architecture is a side effect of the reduction in the number of instructions employed by RISC. With fewer instructions, there's far more overlap among RISC implementations than there is among CISC designs, so it's much easier to move software among RISC machines. Optimizing compilers are used to yield maximum performance from application software, which, under RISC, requires a greater number of machine instructions to execute. And the percentage of machine-dependent features of system software is reduced greatly, yielding an overlap that facilitates moving even this usually highly architecture-dependent software among architectures.

HP was, of course, one of the first computer manufacturers

[NCS OR ONC RPCS?]

Critical to a tightly integrated multivendor LAN is an effective method of implementing remote procedure calls (RPC). The two major RPCs currently in use are Sun Microsystems' Open Network Computing (ONC) and HP/Apollo Division's Network Computing System (NCS).

OSF is in the process of standardizing the RPC mechanism as part of the DEcorum distributed computing environment. DEcorum is backed by HP/Apollo, Digital, IBM and others. The DEcorum RPC is based on the NCS protocols as specified by Apollo and Digital, and HP has included support for them in HP-UX. On the other hand, AT&T has included support for the Sun's ONC protocols in UNIX System V.4, ensuring industry-wide implementation of the Sun .

Further, Sun is working with Netwise to get the Sun RPC established as a de facto standard. Netwise developed a compiler-based product called RPC Tool that provides applications programmers with the ability to design distributed applications quickly across a variety of operating systems and transport layer protocols. NCS has supported multiple transport layer protocols from the start, and now Sun offers this important feature, as well.

RPC Tool supports ONC RPCs and the lesser-known ISO RPC. RPC Tool includes support for the Transport Layer Interface (TLI) developed by AT&T to support the RPC mechanism transparently on top of any transport layer protocol. This releases the ONC RPC from reliance on TCP/IP, which Sun originally used to develop NFS, and opens the RPC development environment to a large number of networks.

When the most common operations on LANs were file transfers and terminal emulation, TCP caused no unnecessary delays because these operations don't require a high-performance network to execute quickly. But with hundreds of RPCs occurring every second on a busy multivendor LAN, TCP has come under fire for introducing too much overhead. HP/Apollo avoided the problem by building the NCS RPC on top of raw datagrams rather than using connection-oriented protocols such as TCP.

Especially dependent on performance issues for functionality are NCS's Location Broker (LB) and ONC's Yellow Pages (YP). Using the NIDL compiler or RPC Tool, programmers partition their programs into many small pieces that can be run in parallel or sequentially on a variety of machines across the LAN. The LB and YP allow the programmer to compile his routines on many different machines so that, at run time, they execute on the least-burdened or otherwise most appropriate machine automatically. NCS and ONC run-time mechanisms "register" or "list" available routines and current load status with the LB or YP so that they can direct RPCs to the most appropriate machines capable of executing them.

NCS has approximately 160 licensed vendors, while ONC claims some 260, primarily because of NFS. Many vendors support both, and according to Geoffrey Baehr, Sun's manager of network platforms, coexistence of the two is the most likely scenario. "You'll probably see RPC development environments that support both NCS and ONC on the same network," says Baehr. "Just tell the compiler which one you want — an NCS RPC or an ONC RPC — and it'll pop it out." Baehr notes, however, that this doesn't imply a shared technology agreement between long-time rivals Sun and HP/Apollo. "Of course, we're still aiming our torpedoes at the East Coast," he jokes.

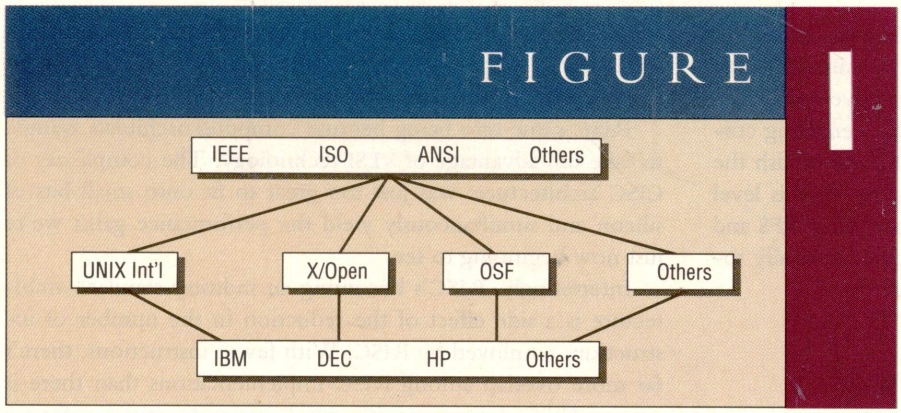


FIGURE I

to design a RISC architecture (the Precision Architecture, or PA), enabling the company to set the pace for industry-standard computing when it successfully wed the architecture with UNIX HP-UX. Though it was originally developed for the company's workstation products, HP has now successfully moved HP-PA/HP-UX into a wide variety of environments, including use as a traditional minicomputer platform in multiuser business settings.

The industry-standard environment is expanding quickly atop the several RISC/UNIX platforms now available from HP and its competitors Sun, Digital, MIPS, Data General, IBM and others. And new complementary technologies are coming online daily. Especially important are the capabilities being brought to the platform by new RPC and X-Window technologies.

Unveiling The RPC

THE FUNDAMENTAL COMPONENT OF communications among machines on LANs is the remote procedure call (RPC). Any program, whether part of the operating system or an application, must use RPCs to tap into the variety of resources on the network. This level of computing just now is coming into its own with compiler-based products such as HP/Apollo Division's Network Interface Definition Language (NIDL) and Netwise's RPC Tool. These products allow programmers to write their applications to execute across the network, using all resources, including idle processor time, as required.

The RPC now is being standardized (see, "NCS OR ONC RPCs?"). Sun's NFS is built on its RPC, so it already exists at thousands of installations. And now Digital and HP are providing solid backing for HP/Apollo's NCS, based on an HP/Apollo-developed RPC.

The RPC is the central element in network computing and thus is a fundamental component of the industry-standard platform. Without an easy way for the programmer to work with RPCs, he'd have no simple method for dealing with the network as a whole in the same way that he currently deals with a single computer.

RPCs are implemented across operating systems, hardware architectures and languages. Thus, they mask system incompatibilities, uniting even widely disparate machines. NFS is an excellent example. Another good example is an environment in which minisupercomputers are combined with RISC-based workstations for complex 3-D applications such as molecular modeling. The chemist doesn't know where the parts of his application are executing, but his modeling runs fast and interactively because the processor-intensive work is being performed on the minisuper.

The X Window System

THE X STANDARD PERFORMS this same function, but from a single display's point of view. Programs written in the X environment can be run from any terminal, workstation or display station that supports the X protocol. And though several implementations of X exist, including DECwindows, Open Look and OSF/Motif, all can function within the same environment (and as multiple windows on the same display) with a surprising consistency in look and feel.

In addition, X programming libraries are available across operating systems and architectures, ensuring that X applications written on one machine will recompile on another. Therefore, in addition to the fact that X applications can be run from many nodes on the network, X unifies architectures by ensuring that X applications can be recompiled on a variety of machines.

Add the capabilities brought to the multivendor network by the RPC, and it's clear that the problem of incompatibility on multivendor networks has been neutralized. We haven't reached Utopia, but it isn't far off.

Easy Ports

THE POWER OF THE MULTIVENDOR, industry-standard RISC/UNIX environment lies in the fact that all operating systems use common file structures and methods of handling I/O, plus similar kernel calls within 32-bit hardware architectures. ANSI-standard C is the core programming language in all systems, providing programmers with a wide variety of tools to build complex, customized software environments tailored to many user requirements.

In fact, no matter which RISC architecture is predominant on your system, if that architecture lost all support tomorrow, it would be simple to move your system software and applications to another industry-standard machine. Add to this the cur-

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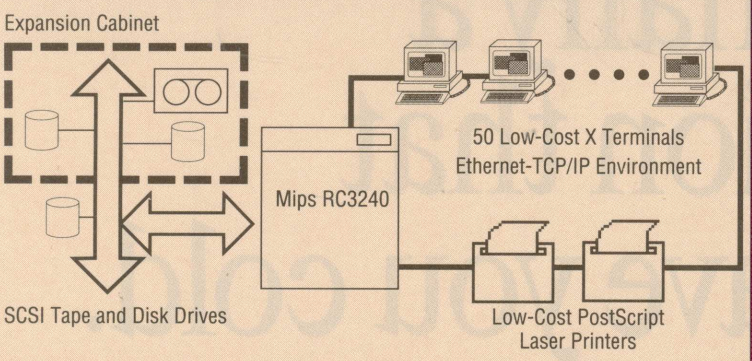
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FIGURE 2



Configuration 1			
Basic Components	Qty.	Unit Price	Total
Mips RC3240 •Rated at 18 mips •RISC/os •8 MB memory •663-MB SCSI disk drive •Cartridge tape drive	1	$33,500	$ 33,500
Additional 8-MB memory boards (additional 40 MB memory)	5	$ 5,400	$ 27,000
Mips expansion cabinet •663-MB SCSI drives (additional 1,326 MB storage) •Cassette tape drive	1 2 1	$ 2,900 $ 7,500 $ 6,500	$ 2,900 $ 15,000 $ 6,500
Uniplex Office Automation* (48-user license)	1	$18,400	$ 18,400
BGL Tech. Unileader Mark I Printer •PostScript-compatible •Built-in Ethernet-TCP/IP support •12 ppm	2	$ 9,690	$ 19,380
Acer X Terminals+	50	$ 1,000	$ 50,000
*Includes OSF/Motif X, word processor, spreadsheet, relational database, screen and menu builder, and advanced office system. +Available only through VARs and OEMs.			$172,680 ($3,450 per seat)

rent standards work being done on SVID, POSIX, OSF/1 and UNIX V.4, and it becomes clear that soon portability problems will stop no one from migrating to any industry-standard platform. Even vendor-unique extensions will be moved easily.

Mips Computer Systems, the company that designed the RISC architecture Digital has popularized, has demonstrated the potential for this portability better than anyone. With its range of compilers and migration tools, you can port from almost any environment onto a Mips machine. In addition to standard C, PASCAL and FORTRAN environments, Mips supports migrations from COBOL, PL/I, Ada, DIBOL and even IBM midrange RPG I and II machines onto its RISC platforms.

Difficult ports demonstrate the ease with which users in the industry-standard environment can move among RISC/UNIX machines, whether those RISC/UNIX architectures come from Digital, HP, IBM, Mips, Sun or a company implementing a Motorola- or Intel-based RISC architecture such as Data General. Mips offers a gateway to the multivendor environment that many companies, especially Digital, are taking advantage of.

Hardware Modules

EQUALLY IMPORTANT TO THE MULTIVENDOR, industry-standard environment are the hardware components of Ethernet, SCSI and VME. Ethernet interface cards are available for all open architectures and will be replaced easily with FDDI interface cards when the cost of implementation for that standard drops. Meanwhile, bridges and routers will be used to tap Ethernet LANs for every drop of throughput. Avoid machines that don't offer a simple hardware upgrade path to FDDI. If a simple path isn't available (i.e., the Ethernet port is built into the machine), then talk to your vendor. Customer demand creates the industry-standard environment.

In addition, SCSI continues its push. Since it was standardized by ANSI in 1986, SCSI has grown at a phenomenal rate. SCSI II, with support for 16- and 32-bit data paths and special "fast" SCSI options, promises to take the standard even further. Add the benefits of the Berkeley Redundant Array of Inexpensive Disks (RAID) architecture and rapidly dropping costs on 5 1/4-inch SCSI drives, and the standard promises to deliver huge amounts of the low-cost storage required by graphically oriented networks.

Shakeouts continue to occur in bus structures, with the Q-bus, VME, PC-AT and Nubus locked in a struggle. For now, Motorola's VME offers the greatest selection of board-level products for LAN environments. Sun's workstations are the most successful machines sporting a VME, while Mips' computers use the PC-AT and VME buses, the Mac II uses the Nubus, and Digital has granted an even longer life to the Q-bus by incorporating it into some of the DECsystem machines. HP builds its own buses but supports all major interface standards via removable cards.



"In addition to reaching large numbers of data processing professionals, HP Professional also reaches qualified buyers who aren't sitting in the computer room."

George Hubman
Marketing VP
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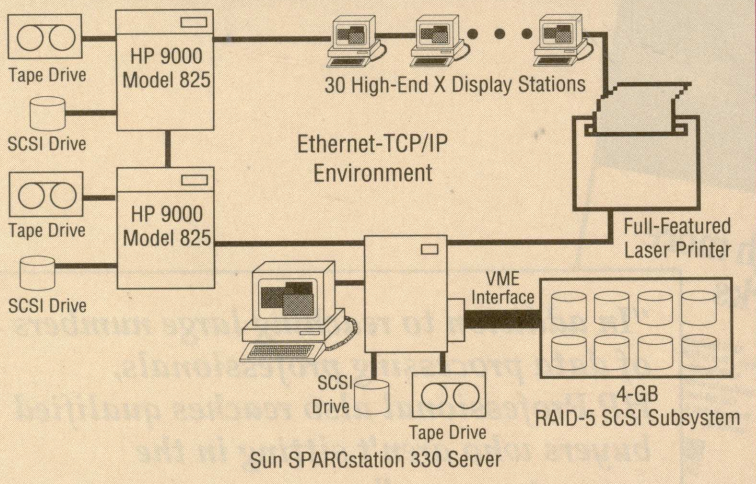
"That's really important, because our products are often used by people outside the DP department."

HP Professional Spans the Marketplace

Hubman summarizes why Walker Richer & Quinn, Inc. is an every-issue advertiser in HP Professional this way, "It's extremely important that non-DP people know about us and HP Professional targets qualified buyers both in and out of the data processing arena."

HP Professional

FIGURE 3



Configuration 3			
Basic Components	Qty.	Unit Price	Total
HP 9000 Model 825S •Rated at 8 mips •HP-UX •8 MB memory •304-MB disk drive •Cartridge tape drive	2	$41,400	$82,800
HP-UX 32-User License	1	$10,500	$10,500
Additional 16-MB memory boards (additional 80 MB memory between two Model 825Ss)	5	$12,000	$60,000
Array Tech. Array Disk System •4.3 GB visible storage •8 620-MB SCSI drives (7 data, 1 parity) •250 I/Os per second (max.) •150,000 hours mean time to data unavailability	1	$70,000	$70,000
HP software development pack with FORTRAN 77 and Pascal compilers and X development system (C is bundled with HP-UX)	1	$12,400	$12,400
Talaris T2492-B Printstation •Handles all commonly used engineering drawing sizes •PostScript-compatible •24 ppm	1	$22,740	$22,740
Network Computing Devices NCD16 •16-inch screen •2.5 MB memory	30	$2,840	$85,200
Sun SPARCstation 330 •Rated at 16 mips •SunOS •8 MB memory •327-MB SCSI disk drive •Cartridge tape drive	1	$28,900	$28,900
			$372,540 ($12,420 per seat)

Further, the Extended Industry Standard Architecture (EISA) — an upgrade to the PC-AT bus (ISA) — and IBM PS/2 Microchannel battle promises to produce a competitive bus structure that many hardware vendors intend to support. HP already has built EISA into its PCs.

All components of the industry-standard hardware environment must be basically plug-and-play. This makes service and upgrades a snap. Keep spare modules on hand. If you have a big installation, keep entire components such as disk drives and workstations as spares or build redundancy into your network according to one of the many methods coming online. The most important feature of an industry-standard network is that it's built from simple modules into complex systems, whether those modules are interface boards or the structured components of the UNIX operating system.

Managing The Net

FINALLY, IT'S IMPORTANT TO keep in mind a network management strategy. Industry-standard network management products have been slow to arrive, but with the recent interest in and support for the Simple Network Management Protocol (SNMP), a viable option is here today. SNMP is a classic example of the power of the third party to develop popular standards that exist independently of any single large vendor.

Developed in academia and now available from a variety of sources (most notably PSI/NYSERNet and SNMP Research), SNMP is defined by the IAB, and all major computer manufacturers are including support for the standard in their network management products. Digital has licensed its implementation from PSI/NYSERNet.

Currently, SNMP is highly dependent on TCP/IP, but work is being done to make it transport layer-independent. Industry sources indicate that SNMP will

enjoy solid growth over the next few years and provide a migration path to ISO's Common Management Information Protocol (CMIP) as it solidifies.

SNMP is especially popular among manufacturers of bridges and routers, because it enables simple monitoring of the load on these devices from a network management station. Using information gathered via SNMP, devices can be reconfigured by the management station to redirect traffic and thus alleviate bottlenecks.

Freedom

FIGURES 2 AND *3* SHOW sample industry-standard configurations. All are based on RISC/UNIX engines, X, SCSI drives and Ethernet-TCP/IP.

Figure 2 is appropriate for departmental-level applications and small to midsize organizations, while *Figure 3* supports technical environments in which individual workstations aren't required but solid graphics capabilities are. Equipment that isn't industry-standard (as defined in this article) is included, because it comes bundled with some of the industry-standard components or, in the case of tape drives, serves as the sole method of loading vendor-supplied software onto the system.

Figure 2, based on one of the least-expensive multiuser RISC/UNIX systems, illustrates how inexpensive a fully featured industry-standard configuration can be. It serves as an ideal "gateway" system into the industry-standard environment.

Figure 3 illustrates the capabilities of a high-end industry-standard system in which technical professionals are provided with advanced capabilities at a cost significantly lower than if individual workstations were implemented. The HP engines, although rated relatively low in mips, feature strong floating-point performance for graphics processing. The RAID subsystem is served to the network via NFS. This configuration already is supported by more than 500 technical applications.

> The payoff ... is a huge base of inexpensive but powerful and fully compatible equipment supported by nearly every vendor.

The payoff for those courageous enough to forsake single, large vendors and march alone into industry-standard territory is a huge base of inexpensive but powerful and fully compatible equipment supported by nearly every vendor. Your technical personnel will remain as important as ever in this environment, but with a supportive third party, a mature computer industry and system managers willing to take a chance, the multivendor industry-standard environment can't help but grow stronger. *—Bradford T. Harrison is a Fort Collins, Colorado-based freelance writer and is a frequent contributor to Professional Press publications.*

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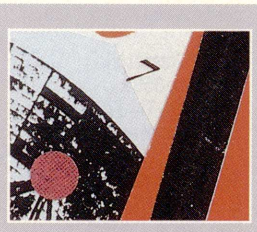
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Lisa Burns

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Training

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We're fortunate to have an excellent system management staff. They were thoroughly trained on the XL machines via the course, "Moving from MPE V to MPE XL: System Manager" and other classes and seminars organized by HP. As a result, our system is doing very well. As we moved different development teams and production jobs onto the new 950, however, there were a few times that we experienced some slow compiles or slow online response. Our systems staff corrected these problems fairly quickly by retuning the machine and by using LaserRX to characterize the problem.

However, it's important to note that the 900 Series machines act very differently than do the MPE V machines in the area of performance and queue tuning. Optimizing the balance between online and batch performance requires training and a bit of real world experience. Be sure that your operations staff has both before attempting to place critical applications or development onto an XL machine.

In addition, it's also important to train your programming staff on the new operating system. Programmers on our staff have attended HP's course, "Moving From MPE V to MPE XL: Application Programmer." This course was very helpful and several of the programmers mentioned that it would have been advantageous to have taken it before they began coding in Native Mode. Of course, the programmers who took it before they began coding said that it didn't mean too much to them at the time, and that they later had to go back and review the material.

On balance, I'd say you should try to schedule your folks into this class and other XL courses as soon as possible after they begin programming. The class will make more sense to them than if they had no experience, and they'll learn things that would have frustrated them if they'd waited too long to take it.

At the very least, ensure that at least one of your staff members is trained in the new code generation process on the XL machines. The concepts of USLs, PREPing and SL use are obsolete in the new XL environment. Your programming team must become fluent in the new process (LINK, XL use, etc.), before they effectively can develop Native Mode applications.

Calling Subprograms In MPE XL

Once we began coding and compiling in Native Mode, we encountered several design issues that had to be solved. All of them involved calling subprograms. The first was the flexible new feature of executable libraries (XLs). On the MPE V machines, our application team was limited to using group and account level segmented libraries (SLs) for modules that weren't

PREPed into our code. Our shop had standards limiting us to Group level SLs for modules internal to our application and account SLs for modules used by several applications. Our shop didn't place modules into the system SL (SL.PUB.SYS). These standards meant that our application team was limited to either PREPing in any multipurpose code or storing it in the single SL file within our one object code group.

Now that we can specify several XLs, either at LINK or at RUN time, we have many more options for storing code. We're currently working on organizing routines within our application to locate them within several XLs, which we plan to specify at link time. This will make the RUN commands for our application much less complex and will prevent program aborts for unresolved externals. We're currently in the process of specifying which routines will be located in which XL in preparation for integration testing. It's likely that each area of our application will have its own XL.

For subprograms supplied by other application development teams, we'll probably set the standard of placing these routines into an account level XL, much like the account SL we use on the MPE V machines. Because all of our marketing-oriented applications run in one account, this will allow many different applications to access these routines.

For your application, you'll need to decide if you'll use XLs, whether they will be specified at LINK or RUN time, and which routines will be located in which library. Once you have a strategy, you can set up standard LINK jobs, production JCL and command files to execute your online programs. This planning will save you a lot of time during development and will make version control procedures more manageable.

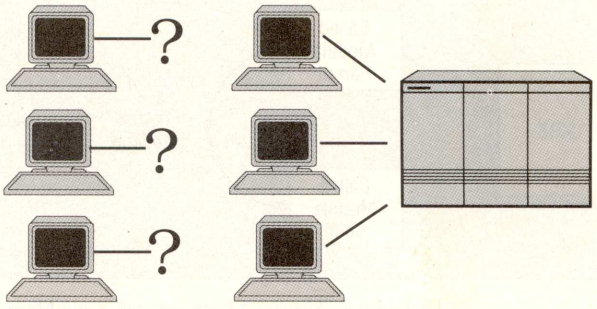
The next issue we encountered when calling subprograms, especially those supplied by other application teams, was data alignment. The majority of the applications within our shop are written in COBOL. This means that the following types of data are 32-bit aligned for XL, where they were 16-bit aligned for MPE V:

```
01 level items
77 level items
SYNC items unless SYNC16 is specified
```

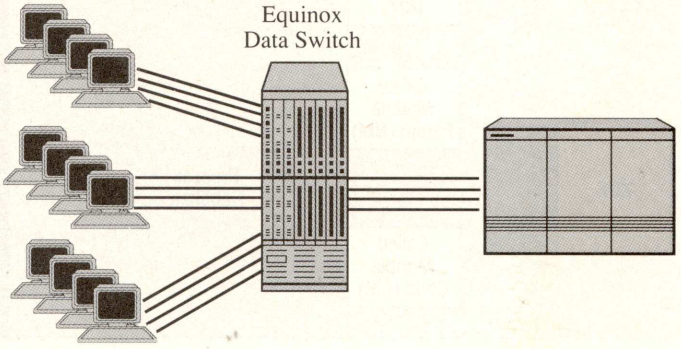
Our application is large and calls many modules supplied by other project teams. for our teams, that we needed to agree with the provider of a subprogram on data alignment. If we let our programs default to 32-bit alignment but called a subprogram that specified 16-bit alignment, data returned in linkage by the subprogram might not align correctly and would produce unexpected results. Our standards call for us to compile our programs with the $CONTROL statements shown in *Figure 1.*

The parameter SYNC16 ensures that SYNC items will be 16-bit aligned. The parameter INDEX16 ensures that items

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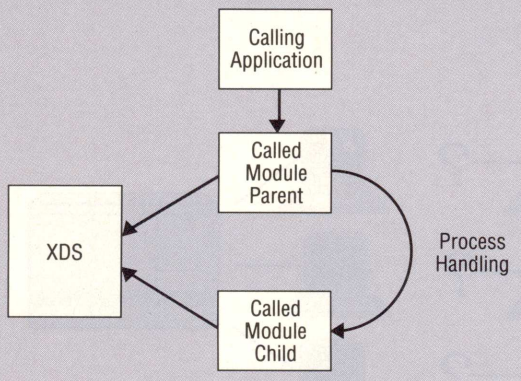
CIRCLE 115 ON READER CARD

FIGURE 1

```
$CONTROL DYNAMIC, LINES=60
$CONTROL CALLINTRINSIC
$CONTROL SYNC16,INDEX16,OPTFEATURES=CALLALIGNED 16 LINKALIGNED16
$CONTROL CROSSREF,MAP,VERBS,VALIDATE,BOUNDS,SYM DEBUG
```

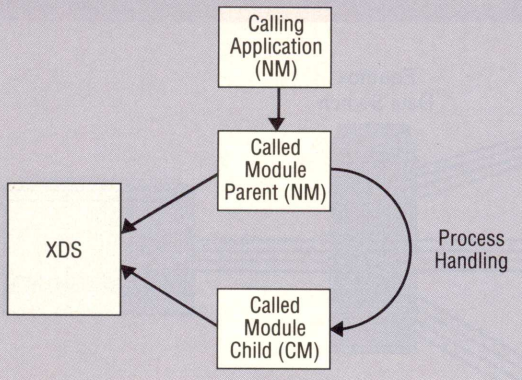
Compile $CONTROL Statements.

FIGURE 2



Migrating to Native Mode created a problem for this module.

FIGURE 3



Switching from CM to NM was unnecessary with this design.

defined as "USAGE IS INDEX" will be 16-bit aligned. These parameters, if specified at the beginning of a source listing, apply to all data items in the program. Alternately, $CONTROL statements can be used before and after a particular data item or items, and will then affect only that buffer. The parameters "OPTFEATURES=CALLALIGNED16 LINKALIGNED16", on the other hand, affect only data items passed between programs and subprograms. The option CALLALIGNED16 will produce a compile error if parameters passed to a subprogram aren't 16-bit aligned. The option LINKALIGNED16 generates code that generates moves by the halfword.

These $CONTROL statements ensure that we don't have alignment problems between programs and subprograms. They also ensure that if data from a linkage area is MOVEd to somewhere else in working storage, alignment still will be OK. These parameters allow called module teams to maintain only one version of the called module source for both MPE V and MPE XL use. Only the $CONTROL statements change between the CM and NM compiles. Within our shop, routines supplied to multiple applications will document whether or not they're compiled SYNC16 or if they're defaulting to 32-bit alignment so that calling applications can react accordingly.

You'll need to make similar decisions. If you're concerned about backwards compatibility, you may decide to use the SYNC16 option. Alert other application teams to this choice in your documentation for the called modules.

Another issue we encountered involved calling CM subprograms from a NM program. If you call Compatibility Mode subprograms from NM, remember that they'll return data that is 16-bit aligned. Because all of our code is 16-bit aligned, this isn't an issue for us. However, for applications choosing default 32-bit alignment, the buffer returned by the CM subprogram should be 16-bit aligned to prevent problems.

A final issue we've run into is calling subprograms in CM vs. NM and its effect on application performance. Many of the utility subprograms we call are called every time a transaction is processed. We didn't want to incur the overhead of calling switch stubs for every line item on a sales order. Fortunately, we were able to work with most of the called module suppliers to get a version of the module in Native Mode. This will allow our system to remain in NM most of the time.

For one of the called modules, however, migrating to NM presented a problem. Because much of the module's

source code was written in SPL. The structure of this module is shown in *Figure 2*. The calling application calls a subprogram that creates a child process. The child process communicates results with the parent via an Extra Data Segment (XDS), and the parent returns the result to the caller in linkage.

To migrate this application to Native Mode, we worked with the developers to get a version of the parent module only compiled in NM. The child process remained in CM. This allowed our application to avoid creating switch stubs. The developers of the called module didn't have to convert the SPL code contained in the child process. Because the parent process was written in COBOL, they simply recompiled it. When the child process is created and activated, the loader realizes that it is a CM program file and loads it accordingly. No switching between CM and NM is needed with this design. *Figure 3* shows this solution.

For your own application, you will need to decide whether to port all or parts to NM. Remember that there is some performance penalty to be paid for switching between NM and CM. If this is to occur frequently, you might consider either letting all of your application remain in CM or making the investment to port all of it to NM. Remember also that parts of MPE XL still execute in CM (KSAM until 2.1, Message files). If your application makes heavy use of these, it may make more sense to remain in CM.

Programmer Productivity

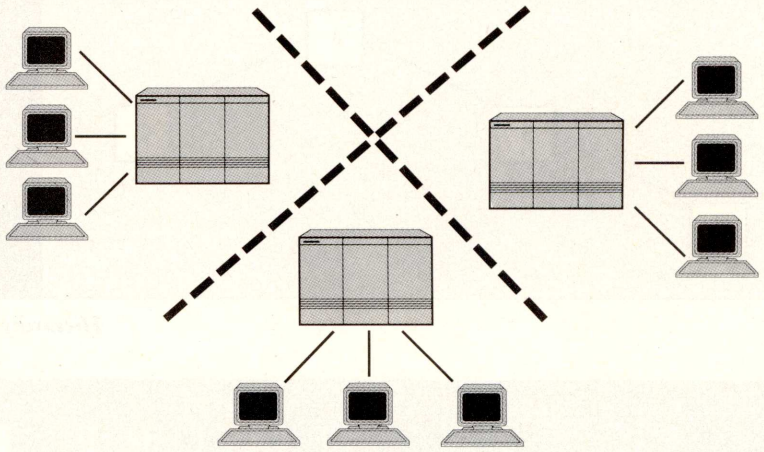
MPE XL has several features that make life much easier for programmers on our project. First, the UNSAT parameter on the LINK command allows our team to perform testing without waiting for all modules in a hierarchy to be completed. *Figure 4* shows the structure of one of our programs. The UNSAT parameter allows us to test modules A and B without waiting for modules C and D to be complete. This has improved our ability to test code in a timely fashion and has removed some of our critical path problems.

To test module A and B, we wrote a dummy module called oms9999p. The source code for this module is shown in *Figure 5*. This module was PREPPED into its own XL, UNSATXL. On the LINK statement for linking all the modules for testing, we specified the oms9999p XL as the last XL and added the UNSAT parameter as follows:

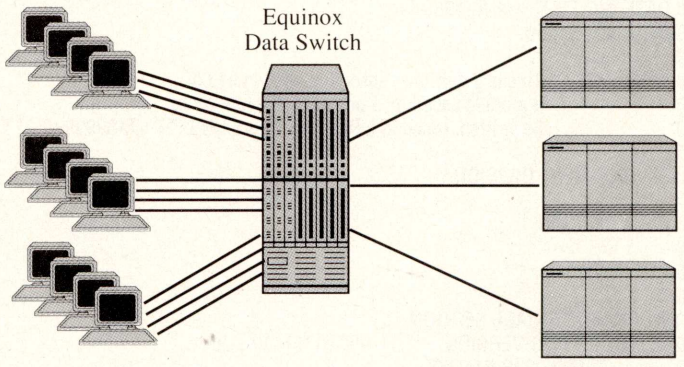
```
:LINK FROM OMS2400S;
:TO=OMS2400P;&
:XL="XL1, XL2,UNSATXL ";&
:UNSAT="oms9999p"
```

This allows modules A and B to be linked and tested without the code for C and D being complete. When A executes and issues a call to C, the code for oms9999p is invoked. This produces a display statement, "dummy module

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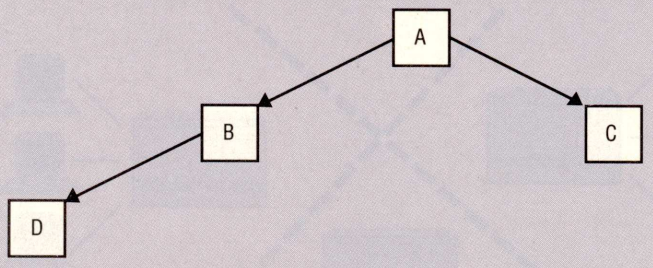
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CIRCLE 116 ON READER CARD

called," and A continues executing. Similarly, when A calls B and B calls D, the code for oms9999p is again invoked. Therefore, testing for A and B can proceed independently.

Another feature that has been a tremendous benefit to our team is the greatly increased stack size available on the XL machines. This was the feature that originally attracted us to Native Mode. Our application uses extremely large data areas, and we were hampered on the MPE V machines to 32K words in our stack and 32K words in a user Extra Data Segment that we used as an auxiliary storage area. Even with the XDS, our application ran dangerously close to the stack limit on the MPE V machines.

FIGURE 4



Hierarchy chart.

FIGURE 5

```
001000$CONTROL DYNAMIC,LIST,CROSSREF
001100$TITLE "OMS9999S  DUMMY ROUTINE"
001200 IDENTIFICATION DIVISION.
001300
001400 PROGRAM-ID.      OMS9999P.
001500 AUTHOR.          WWOMS Team.
001600 DATE-WRITTEN.    AUG 1989.
001700 DATE-COMPILED.
002100
002200 REMARKS.      This is a dummy subroutine used in lieu of
002300               a module called by a program that has yet to
002400               be written. (used in a Run command, UNSAT="OMS9999P".
002500
002600 ENVIRONMENT DIVISION.
002700
002800 DATA DIVISION.
002900
003000 FILE SECTION.
003100
003200 WORKING-STORAGE SECTION.
003300 01  W000-PROG-VERSION          PIC X(16)   VALUE
003400          "OMS9999P.A.00.00".
003500 LINKAGE SECTION.
003600 01  DUMMY-PARAMETER            PIC X(20).
003700 PROCEDURE DIVISION using DUMMY-PARAMETER.
003800 000-START.
003900     DISPLAY " dummy module called " W000-PROG-VERSION.
004000     GOBACK.
```

Dummy routine for UNSAT parameter.

On several occasions, we had to create complex workarounds in the program logic to prevent stack overflows, especially when calling VPLUS intrinsics. The XDS also limited the amount of data that a user could put into one transaction to 140 sales order line items. This limitation caused workarounds and frustration.

Given these problems, we were very excited about seemingly infinite stack sizes. We began right away by removing the 140-line limitation. We now allow up to 2,000 line items by placing a table of 500 bytes, occurring 2,000 times (an array of one million bytes), right into the working storage of our main online program, and eliminating the XDS completely from the design. The removal of the 32K working storage limit has made coding much easier, and we've been able to simplify much of our screen logic.

But imagine our surprise when a program blew up with a "NM Stack Overflow" message! What about those huge NM stacks we had heard about? The situation was more complex than we thought. In a NM environment, the data area for the outer block (main program) is placed into one global data area referenced by the data pointer (DP). Local variables from dynamic subprograms, however, are placed in the NM Stack, referenced by the stack pointer (SP). Data from dynamic subprograms is limited to a system maximum configurable value of 32,767 32-bit words, or 128K bytes.

In our case, the million-byte array from our main program was allocated in the global data area successfully and the outer block ran fine. Our dynamic subprogram, however, was allocating the array again in its own working storage, rather than referencing the copy in linkage. This meant that the operating system tried to place the million byte array into the NM stack, which has a maximum configurable area of 32,767 32-bit words, or 128K bytes. At the point that the subprogram was called, our program aborted with the stack overflow message.

The solution to this problem was simply to keep only one copy of the very large array in linkage, rather than mak-

ing additional copies in the working storage of the dynamic subroutines. You should design your own application with this thought in mind. Space used by dynamic subroutines is limited to 128K bytes, unless a NMSTACK override parameter is used at LINK or RUN time. If for some reason you *must* have very large data areas in subprograms' working storage, you'll need to use this parameter to avoid a stack overflow. I would be very surprised if you really needed this override, however.

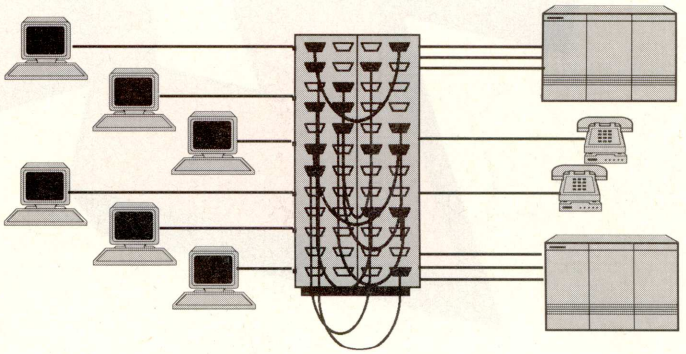
We had some initial problems debugging on the XL machine because tools were not available right away. Now, however, several good tools are available. HP tools include Toolset/XL, System Debug XL and Symbolic Debugger XL. As of MPE XL release 2.0, all three of these products work with COBOL. We've been using Toolset/XL and are happy with the results. Our team was comfortable with Toolset on the MPE V machines and was able to make the transition to XL easily. The ability to display data by variable name and the data trace capability have simplified our debugging greatly. System Debug XL is very powerful, but requires some knowledge of operating system environment. As application programmers, we have not had to use this product very much. Now that Symbolic Debugger XL is available for COBOL, we plan to investigate it as well.

One thing to keep in mind, however, is that for CM debugging, you're limited to System Debug XL. Toolset/XL and System Debug XL don't allow symbolic debugging of CM code. If you're really having problems with a CM module, you may want to get access to an MPE V machine and use Toolset on that CPU to gain symbolic debug ability. An even better idea would be to develop and test the CM code on a MPE V machine before ever moving it to NM. This will simplify the debugging that must be done on the XL machine.

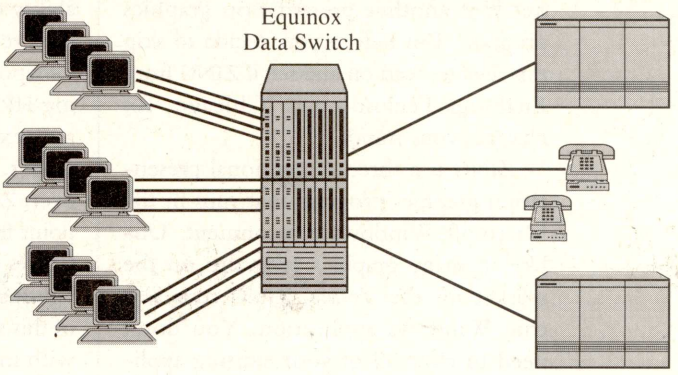
All in all, we've been very happy with the new XL development environment. For our particular application, the removal of the 32K stack limit alone was worth moving to Native Mode. For your application team, I think you'll also find that the XL library flexibility, the new UNSAT feature, large data areas and powerful debugging features greatly improve your teams' productivity. Taking the time now to train your staff and plan your XL strategy and called module strategy will pay off handsomely down the road as you begin NM development in earnest. —*Lisa Burns manages a MIS software development team at HP's Corporate Offices Division, Palo Alto, CA.*

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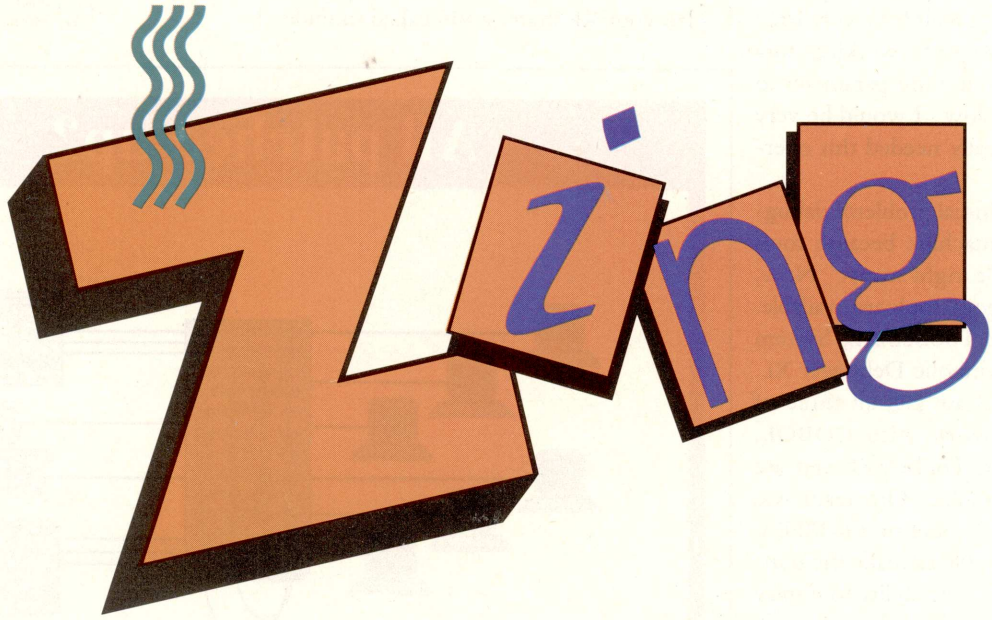
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Not Just Another Graphics Presentation Program



Miles B. Kehoe

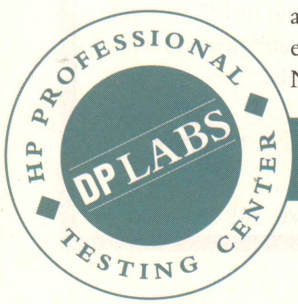
You may think the last thing the world needs is another presentation graphics program. But before you decide to skip this review, read on and see if ZING from Enabling Technologies (Chicago, IL) changes your mind.

ZING is a three-dimensional presentation graphics program that runs in the Microsoft Windows environment. Unlike so many graphics programs on the market for the Vectra, ZING runs as a true Windows application. You don't need to close all of your existing applications to start up, and you don't lose the ability to easily toggle back and forth to any of the capabilities of Windows. I even installed ZING as an object under NewWave without any difficulty.

One unique feature of ZING is its ability to easily create and display objects in three dimensions from virtually any viewpoint. Like many programs, including HP's Drawing Gallery, you can create text or load provided figures and shapes. Unlike Drawing Gallery, however, ZING lets you select the camera or point from which you wish to view your figures or text. It also lets you choose the lighting or shading of your figures. If any of this sounds interesting and unique, stay with me.

Configurations

ZING runs under Microsoft Windows Version 1.03 or greater. As long as your Vectra (or HP 150) is configured to run



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One unique feature of ZING is its ability to easily create and display objects in three dimensions from any viewpoint. It also lets you use existing figures and letters to generate images.

Windows, you're ready to go.

Unfortunately, there are a number of configurations that technically run Windows, but they might not be ideal for a memory and calculation-intensive application such as ZING. I experimented with ZING on a Vectra/ES with 2 MB of memory, a 40-MB disc and an EGA display. I also used ZING on a 20 MHz 386 PC with 6 MB of memory, an 80-MB hard disc and a VGA monitor. I used a Microsoft Mouse with both.

The 386 was markedly faster with ZING, although the ES/12 was not unacceptable. My personal bias is that you need a 386 to run Windows, but the Vectra served well.

I also tested ZING on an original HP 150 with 2 MB of memory and a 15-MB hard disc under Windows 1.03. It wasn't fast by any stretch of the imagination, but it did run. I don't suggest everyday use of ZING on your HP 150. Still, it's nice to know it's there.

The printing and hardcopy output was on an HP LaserJet IIP and a ColorJet. Both produced exceptional quality output, although any printer properly installed in Windows should be able to produce good quality printouts.

Documentation

ZING comes with three manuals. The one you'll use first is titled *Before You Begin Installation Guide*. It provides the information you need to successfully perform an installation. Like all ZING documentation, this manual is for both Windows and Macintosh users. The section about setting up Windows is minimal and could be more clear. However, when used in conjunction with the Microsoft Windows references and a little help from a friend, you can get ready for ZING.

The actual ZING installation is a cinch. You need to copy the files from the floppy disk onto your hard drive. I used the XCOPY command, which is easier than repeatedly copying directories using the Windows COPY menu option.

The second manual you'll need to refer to is the ZING *Guided Tour*. It leads you step by step through the process of learning just enough ZING to get you going on your own. Even if you've used computers for years, you'll find *Guided Tour* is completely synchronized with the software. I didn't find a single place where what was on the screen didn't match with the *Tour*'s instructions.

The last manual in the set is the ZING *Reference*. It, too, is clear, concise and task oriented. It leads you step by step through every task, providing good explanations of the process involved.

Features

As you'd expect from any presentation graphics application, ZING lets you use existing figures and letters to generate images. When it comes to creating screens from scratch, ZING uses some unique features.

The one I liked most is the Lathe Window. In brief, you can specify the outline of a symmetric shape and have ZING create the solid by rotating the outline around the axis. With ZING's freehand drawing mode, you can create sophisticated solids from simple cylinders to complex objects. The tutorial leads you through the creation of a complex scene including a table, coffee pot, and coffee cup and saucer. With practice, you can create almost any shape you can imagine for your presentations.

Another nice feature of ZING is the ability to look at objects from any angle. You have complete control over the perspective, the viewing angle and even the intensity of the lighting. ZING allows you to look from several views simultaneously by splitting the ZING screen, or universe into multiple windows.

You also have control over the sources of light in the ZING universe. Usually, presentation graphics programs don't allow you to specify light sources. ZING objects are displayed in ambient light, that provides general overhead lighting with no harsh shadows. However, you can select up to eight light sources and their locations. This allows you to create side lighting, direct overhead lighting, or any combination of the number and sources of lighting.

When used in conjunction with the different viewpoints and camera locations, you can create very sophisticated presentation graphics unlike those you normally see from more conventional applications.

Formats

ZING reads its formats only, but allows you to save objects and figures in TIFF Microsoft Paint or ZSoft Paintbrush formats in a number of different resolutions. This provides good ability to interchange with a number of popular formats. Unfortunately, HP's Drawing Gallery can only output the same formats, so interchanging graphics will be difficult.

Changes

It's clear throughout the documentation that ZING was originally written for the Apple Macintosh computer, but the interface on the Vectra looks very much like a standard Windows application. I'd like to see additional documentation for the Windows version. There are a number of places where the documentation leaves Vectra and Windows customers at the mercy of Microsoft documentation or trial and error. As powerful as ZING is, I wonder if I've missed some of its features because of Macintosh-directed documentation.

Another symptom of the Windows

environment required by ZING is the quality of display available on the Vectra. I've never been a fan of Window's color palette and patterns. ZING, like most Windows applications, is limited to the tools offered by Microsoft.

Finally, I'd like to see ZING make more use of the hot keys, which many Windows applications use. For example, to select different camera views you can shortcut the Windows menu by entering control codes. Pressing CTRL-W shows the front view of the object; CTRL-2 shows the top view, and so on. I couldn't find any easy mnemonic way to remember the control codes. If I were to use ZING a lot, I'd learn them well. Luckily, they're the same codes as on the Macintosh version of the product. Still, an easier way to remember codes like CTRL-F for front or CTRL-B for back would help new users just when they're most unfamiliar with the program.

Windows Value

Because ZING runs as a Windows application, there are a number of handy features you don't find in non-Windows applications. First, you can start several copies of ZING at the same time. Of course, you need a lot of memory to do this, and it's possible to create an image so complex that there's insuffcient memory to display it.

ZING also uses cut and paste of Windows to move objects and images back and forth. Because it uses the Windows clipboard, you can exchange images with almost any application that runs with Windows. You can then use all of ZING's features to rotate the bit images from almost any source.

In all, ZING is a handy graphics application that solves the unique problem of creating three-dimensional solid objects in presentation graphics. The interface is a standard Windows menu-like interface with a number of enhanced icon-driven commands to perform certain common tasks. It's well documented, easy to use, powerful, and can help make your presentations unique.

ZING

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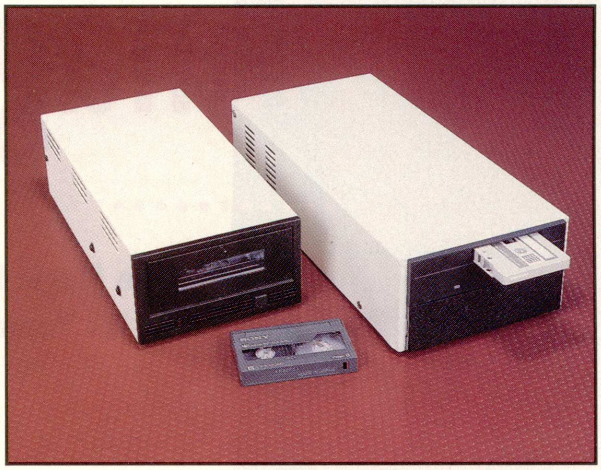
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'Warehouse' Management



The Magic Lies In Its Versatility

Do you remember the first time you worked with an IMAGE database? You may have been impressed with how your firm's information needs could be modeled in IMAGE datasets and at how easily you could create very sophisticated IMAGE structures to store and provide speedy access to that critical data.

Of course, running a business requires more than just the structure for the data. There has to be programs written to add, modify, delete and retrieve it. And over time, the programs were written and the structures may have undergone slight modifications, and the amount of data grew and grew. At some point you may have to write (and maintain) another mountain of programs to expunge the old information to tape. That may work well until the database structure changes slightly or the vice president of finance asks for a report requiring some information from the archive.

Since August of last year there has been help available for managing the data within the database so that the old infor-

Joel Martin

HP PROFESSIONAL DPLABS TESTING CENTER

mation is at hand but not in the way. The product is Warehouse and was developed by Taurus Software (Palo Alto, CA). Warehouse is an easy product to describe. It provides facilities for archiving data and retrieving data from an archive. But describing Warehouse as archival and retrieval is akin to describing IMAGE as just software to link files. The magic lies in the variety of ways you can put Warehouse to use.

Installation And Set-Up

Warehouse is shipped on a single small 1600-bpi magnetic tape. The product includes two manuals, a demo guide and a user guide, bundled together in a single three-ring binder.

Installation of Warehouse was simple and proceeded without a hitch. I restored a single program file to the PUB.SYS group and ran the program per the installation instructions. Running the installation program creates the necessary account and groups and restores the remainder of the files. Following the restore of the files, I ran Warehouse with a run-time parameter in order to validate my copy. The whole process took only a couple of minutes.

Features And Test Results

Warehouse is an easy product to learn. There are five simple commands and 14 statements. The commands, such as Help or Exit, perform their functions as soon as you type them and press the Return key. The statements aren't executed until Warehouse encounters a GO statement. Warehouse commands and statements are assembled into scripts, which are miniprograms to be interpreted and run by Warehouse.

The simplest Warehouse script needs only five statements — Input, Output, Read, Copy and Endread. *Program 1* gives a simple example of a script.

Program 1 uses the customer database, CUSTDB, as input and creates an archive file on magnetic tape. Records from the CUSTOMERS' dataset of all customers who haven't made a purchase from my hypothetical sales organization since January 1, 1985 will be copied to the tape file. I could just as easily archive to another database or other MPE file by specifying so in the OUTPUT statement.

We can build on this first example by not just copying the data, but deleting it from the input database after the archive (COPY) operation. (*Program 2*)

It seems easy, and it is. Presumably, the customers to be deleted have orders in the orders dataset. Let's put each customer's orders to the archive along with the customer record. (*Program 3*)

Presumably, you'll want to perform this function annually and perhaps print a report of the customers archived. (*Program 4*)

Describing Warehouse as archival and retrieval is akin to describing IMAGE as just software to link files.

The script in *Program 4* will retrieve all the customers who haven't made a purchase in the 1,500 days (about four years) preceding today and will copy their records along with their orders to a tape file. The customers and orders will be deleted, but not before printing a simple report of the customer IDs and names sorted by customer ID. I could have chosen to delete the orders but retain the customer information, even updating the customer status to show that orders have been archived, with only a slight modification to the script.

Taurus Technical Support recommends copying manual master set information whenever copying a detail set. Otherwise, if at a later date you delete the master set entry from the live database, you won't be able to restore the detail set records from the archive because of the absence of an IMAGE chain head.

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CIRCLE 101 ON READER CARD

Program 1.

```
INPUT CUSTDB
OUTPUT TAPE

READ CUSTOMERS FOR LAST-PURCHASE < 19850101
  COPY CUSTOMERS
ENDREAD

GO
```

A simple Warehouse script.

Program 2.

```
INPUT CUSTDB
OUTPUT TAPE

READ CUSTOMERS FOR LAST-PURCHASE < 19850101
  COPY CUSTOMERS
  DELETE CUSTOMERS
ENDREAD


GO
```

Data is copied to tape, then deleted from input.

Program 3.

```
INPUT CUSTDB
OUTPUT TAPE

READ CUSTOMERS FOR LAST-PURCHASE < 19850101
  COPY CUSTOMERS
  READ ORDERS FOR &
      ORDERS.CUSTOMER-ID =
        CUSTOMERS.CUSTOMER-ID
    COPY ORDERS
    DELETE ORDERS
  ENDREAD
  DELETE CUSTOMERS
ENDREAD

GO
```

Customers' orders and records are archived.

Selected information from the archive created in *Program 4* can be retrieved from the archive and posted back to the database by swapping the INPUT and OUTPUT file names and removing the DELETE statements. If you wanted to just retrieve the Hewlett-Packard orders, that could be done by changing the first READ statement to READ CUSTOMERS FOR CUSTOMER-ID="HP." Moving information from one database into another similarly structured database is a snap.

Information about the input file structure and the archival script is maintained in the archive file, unless the archive file is itself a database, so that information from old archive files can be returned into a modified database structure so long as some basics, e.g., the dataset names, remain the same. Warehouse maps the data items in the archive to the data items in the output database by matching the input data item name with the output data item name. If the data items now are of different types, then Warehouse automatically performs the necessary type conversion and issues a warning message when the retrieval script is run. Storing the input file structure and archival script with the archived data insures that all information necessary to retrieve the data (or just report on it) will be available at all times.

Program 4 also illustrates some of the printing facilities of Warehouse. Although the facilities are relatively limited, they're more than sufficient for the product's intended purpose. In addition to the Print statement (which supports multiple detail lines and sorting), there are statements for headings and footings as well. The page length can be varied with the Set statement, and Warehouse includes key words for the date, time and page number. Multiple detail lines are supported by adding Print statements. Multiple line headers and footers are created by additional Header and Footer statements. *Program 4* will produce a report with a two-line header. Sorting of the printed output is accomplished by defining the sort level within brackets ([1]) immediately following the item to be used as a sort key.

The most impressive facility of Warehouse is its ability to define very sophisticated selections across multiple datasets. Release 2, due out this month, also will support selections across multiple databases. This selection facility can take advantage of variables that you create to serve as counters or validation flags. In this way, test databases can be created by selecting only the first 100 or so records that meet the desired criteria. Multiple

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CIRCLE 176 ON READER CARD

passes through a dataset(s) also can be performed through the clever use of a Boolean variable.

The *Warehouse User Guide* provides several well-chosen examples of the power of its scripting language. Records can be selected on the basis of a partial data item (e.g., match the first five characters of the ZIP code field) and Warehouse supports all of the standard numeric functions (e.g. addition, subtraction, multiplication, less than, etc.) as well as the Boolean functions AND, OR, and MOD. If you wanted to select only those orders whose order quantity was a multiple of seven, you could do so very easily.

At the end of the execution of a script, Warehouse prints a short table of summary statistics including the elapsed and CPU time, the number of records read and selected, and the amount of print generated.

The "canned" Warehouse demonstration package takes about 20 minutes to run. I performed dozens of variations on the demonstration using my own test database and had no trouble archiving or retrieving. I made a number of efforts to force a Warehouse error, all without success. I loaded an archive into a modified database structure and Warehouse retrieved all the data, initialized the new data items to blanks or zeros and warned me whenever it encountered something new, like a change in a data item's length. All the appropriate IMAGE errors were trapped at run time. (I tried to retrieve detail records without retrieving the associated manual master set entries and tried to post master set entries from an archive back to the database without first deleting them. Warehouse correctly responded with a "missing chain head" or "duplicate key value" IMAGE error in each case.)

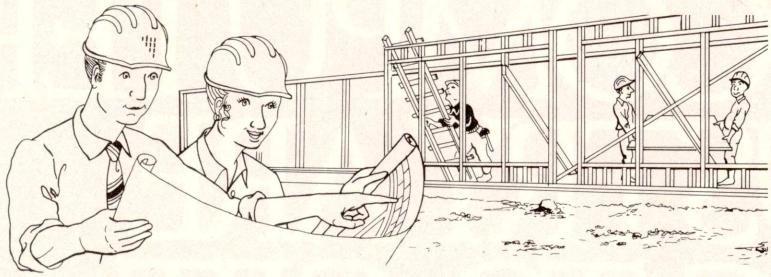
Errors And Error Handling

As noted earlier, Warehouse trapped any IMAGE error condition I tried to create. When I restored from an archive into a modified database structure Warehouse issued the appropriate warnings about data items missing, added or changed.

Warehouse allows you near total control over you IMAGE locking strategy and will warn you if your strategy might result in a deadlock. You also will be warned if your search requires a serial read of a dataset. (In most cases it would be a good idea to use Warehouse when other users are not accessing the database.) If Warehouse is run in batch mode then the JCW will set to FATAL in the event of a Warehouse error. Those of us with batch schedule software appreciate the feature very much.

One area I would like to see changed is how Warehouse handles the active script. Release 1 requires that you re-en-

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Program 4.

```
INPUT CUSTDB
OUTPUT TAPE

HEADER "Customers deleted on ", $DATE
HEADER "———— —— — ———", &
       "—"

FOOTER $TAB 20, "Page: ", $PAGENO

READ CUSTOMERS FOR LAST-PURCHASE < &
    YYYYMMDD (DAYNUM($TODAY) - 1500)
  COPY CUSTOMERS
  READ ORDERS FOR &
      ORDERS.CUSTOMER-ID =
        CUSTOMERS.CUSTOMER-ID
    COPY ORDERS
    DELETE ORDERS
  ENDREAD
  PRINT CUSTOMER-ID[1], $TAB 30, &
    CUSTOMER-NAME
  DELETE CUSTOMERS
ENDREAD

GO
```

The archiving can be performed annually.

ter the entire script of the script as entered has a syntax error. This is not a problem if you create and store scripts with a text editor, but it would be much more convenient to be able to retype the offending line and proceed from the point of the error. Perhaps this will be addressed in the upcoming release.

Technical Support

The standard maintenance fee includes unlimited technical support that's available from 8 a.m. to 6 p.m. Pacific time. Taurus Software will provide a one-day class at your site at an extra cost.

Warehouse is a novel product designed to manage the archival and retrieval of IMAGE and TurboIMAGE database information. It can be used to create test or history databases, reduce the processing time required to search your current information and free disc space of old information. The software is well implemented, rich in features and very robust. If you need to trim your databases without sacrificing the option of restoring or reporting upon some or all of your archived data, call Taurus Software for a demonstration.

Warehouse Release A.01

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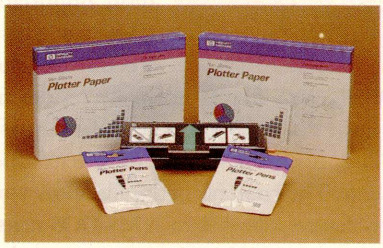
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PC TIPS

Miles B. Kehoe

An Explanation Of Valid CONFIG.SYS Statements

Modify My CONFIG.SYS File?

One of the most important files on your Vectra is the CONFIG.SYS file. It normally resides in the root directory on your default start-up disc, normally C:\ on most hard disc systems. The contents of this file allow you to configure your system as MS-DOS starts.

On most Vectra systems, the CONFIG.SYS is minimal and provided by HP. Below is a typical file as shipped by HP.

```
FILES=20
BUFFERS=20
SHELL=PAMCODE.EXE ROOT
```

This will work fine on a system with no special hardware or software. Sooner or later you'll find a program will ask, during installation, if it can modify your CONFIG.SYS file. If it hasn't happened to you yet, or if it has and you still worry if something has changed on your Vectra, read on and I'll try to explain what the other valid statements in CONFIG.SYS do for you.

First Things First

Before you make any changes to your system, be sure to have a current backup. Changes to CONFIG.SYS can do drastic things to your system, and while they are rarely catastrophic, they can be annoying.

In addition to a current backup, I suggest you have a bootable floppy disc ready. Certain errors in CONFIG.SYS can cause a system to crash before you get into PAM or the DOS command processor. Check your reference manual for complete details, but you can usually build a bootable floppy by formatting a new diskette by typing:

```
FORMAT A:/S
```

The "/S" tells MS-DOS to put the invisible system files on the floppy disc. Once you have finished the formatting, look at the files on the diskette to be sure COMMAND.COM was placed on your disc during formatting: Depending on what operating system you are using, it may or may not be automatic.

If it isn't there, simply type:

```
COPY C:\COMMAND.COM A:
```

Then, reset your system to verify that the diskette is bootable. If not, remove the floppy disc, reboot from your hard disc, and check that you followed the instructions above.

Once you have a floppy disc that can boot, you can proceed confident that you always can get your system back to its present state with minimum difficulty.

BREAK	Used to Manage CTRL-C Checking
BUFFERS	Controls the number of memory buffers available for disc input and output
COUNTRY	Sets date, time and currency defaults
DEVICE	Specifies a device driver to load
DRIVEPARM	Used to change disc characteristics
FCBS	Controls the maximum number of open file control blocks
FILES	Controls the maximum number of open files
LASTDRIVE	Determines the maximum number of disc drive references
SHELL	Specifies the default command processor
STACKS	Controls the size and number of system "stack frames"

Table 1: Valid CONFIG.SYS statements.

The Statements

Table 1 lists the valid statements in CONFIG.SYS. I will work through each of them in sequence, and then I'll have a few suggestions you might want to consider for your Vectra.

BREAK: The BREAK statement is used to determine how MS-DOS will respond to CTRL-C. Normally, a CTRL-C only will interrupt a program while it is performing character input or output (I/O) to the console or a serial communications port. This is how MS-DOS attempts to protect disc I/O.

This can be a problem when you want to interrupt a program that does little or no console I/O. This is usually the case when a programmer is writing a program, but not often the case for most users. The default value, the one used if BREAK is not in your CONFIG.SYS, is "OFF."

By setting BREAK=ON, MS-DOS checks for CTRL-C from the console with every task the operating system performs including disc I/O and file operations. It can lead to corrupt data files, and it tends to slow the system performance some because the check occurs with each internal task performed by MS-DOS. Still, if you want more control over your applications, this is one way to do it.

BUFFERS: This statement lets you control the number of memory blocks or buffers that will be reserved for disc I/O.

When MS-DOS manages files and disc access, it reads blocks of data from the disc into memory. If the data it needs is

already in memory, your response time will drop because MS-DOS doesn't need to read the disc.

Because the optimum number of buffers varies with the type and speed of your disc and the nature of the applications you are using, no one answer is right for everyone. The default value is

Changes to CONFIG.SYS can do drastic things to your system.

two or three depending on the version of MS-DOS you are using.

Personally, on my hard-disc based Vectra, I like to use:

```
BUFFERS=32
```

I admit I use it more out of habit than because of any sure knowledge on my part. I'd suggest you try a few values between 20 and 32 and see which you like best.

No matter which you settle on, be sure to have at least 20 if you have a hard-disc based system.

COUNTRY: The COUNTRY statement determines the date and time format that MS-DOS will use. If you are using your Vectra outside of the U.S., check your Vectra documentation to see what the value of COUNTRY should be. In addition, see if you need to specify any international keyboard drivers.

DEVICE: When you have a special device driver that might be associated with an interface card or network, you have to direct MS-DOS to load the control program, or "driver," for that card.

Usually you do this using a statement like:

```
DEVICE=C:\SYS\ANSI.SYS
```

In addition, the driver may expect some additional information in the DEVICE statement. Check with the reference manual for the interface card or device you're installing.

You will most likely find device drivers for large disc devices, HP-IB disc and tape devices, and for networks. You must also specify a device driver for extended and expanded memory managers.

DRIVEPARM: This statement lets you modify the parameters that are associated with a particular block device. A block device is one in which I/O occurs in sections, of "blocks." A disc drive is an example of a typical block device.

Non-block devices usually perform I/O one character at a time. The keyboard is an example of a non-block device.

Because the internal parameters of a disc or network device are very important to proper operation, I suggest you use DRIVEPARM only on the advice of someone who really knows what he's doing.

FCBS: Internally, MS-DOS supports two methods of file access: file handles and file control blocks (FCB). Normally, you don't need to know how a program accesses a file. However, if you're using a network or other application that requires use of the SHARE command, you might find you can improve the performance of your system by specifying additional FCBs be reserved.

The FCB is associated with each file your application has opened simultaneously. The default is four, meaning your system can have only four files open at any time. If an application attempts to open more, MS-DOS will temporarily close one of the open files to reuse the FCB.

If you are using an application that is very file intensive, or if you are using a network, you might increase the number. You also can specify the number of files that MS-DOS will not close automatically. Again, I suggest you use this statement only when there is a need or on the advice of a specialist who is familiar with your application.

FILES: Where the FCBS statement controls file control blocks, the FILES statement controls the maximum number of file handles. Unlike FCBS, increasing the number of FILES uses system

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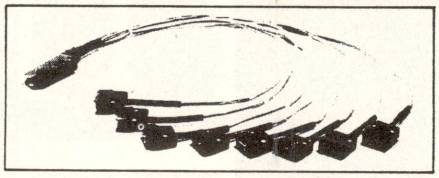
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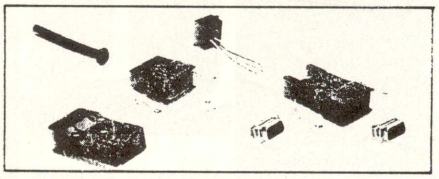
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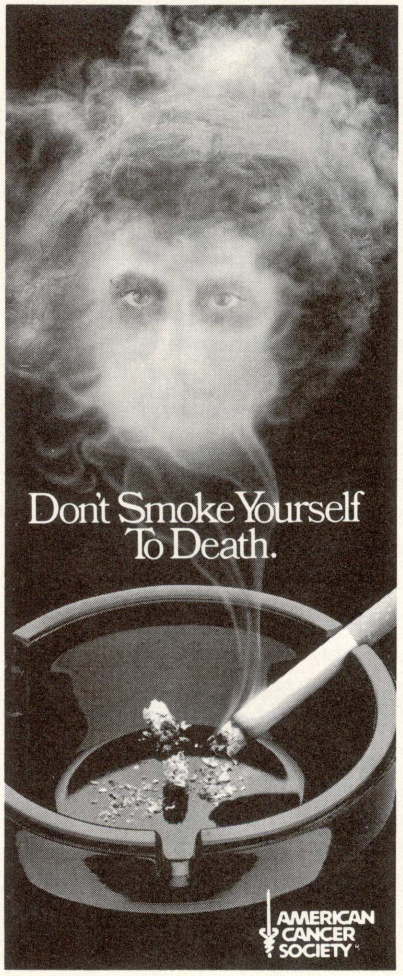
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CIRCLE 183 ON READER CARD



memory so each application you use will run in slightly less memory.

The maximum number of file handles that can be used by a single application is 20. However, with networks and windowing applications, you may want to set this number higher. On my system, with PC-NFS and MS-Windows, I use FILES=64.

Note that PC-NFS doesn't use FILES to determine the maximum number of network file handles any task can use. Instead, it uses the /F parameter in the DEVICE statement that specifies the PCNFSD.SYS device. Check with your PC-NFS documentation if you will be using a number of files across the network.

LASTDRIVE: By default, MS-DOS allocates buffers and control blocks for five disc drives. If you have more than five physical drives, the default is the actual number of drives.

However, if you will be using network file systems like PC-NFS, or if you will be using logical drives created with commands like SUBST, you will want to set the LASTDRIVE parameter. Note that MS-DOS does allocate memory for each drive, whether you use it or not. Therefore, keep this number as low as possible without interfering with your network usage.

SHELL: By default, MS-DOS will load COMMAND.COM from the root directory of the boot disc as the command program or "shell." On the Vectra and HP 150, HP usually sets the SHELL to load PAM.

I'll have a few things to say about this default later: For now, suffice it to say that I don't use this statement on any of my systems.

By the way, you can't use just any program as a SHELL. The SHELL program has to provide some special routines to handle disc errors and keyboard interrupts, so I'd suggest you stick with either PAM or with no SHELL statement.

STACKS: Whenever the Intel processor in your Vectra receives an interrupt, the processor saves all its important registers and data values.

By default, MS-DOS allocates nine blocks of 128 bytes to preserve the interrupts. I would suggest you leave the STACKS at the default unless you start seeing the error:

```
Internal Stack Error
```

This means that interrupts are occurring too quickly. It could be a problem in one of your programs, or it could be a valid need for more STACK space. In any case, I suggest you contact the support people at the company that provides the program that causes the error. Check your reference manual for the syntax.

Using The Statements

My first suggestion for Vectra owners, without exception, is to remove PAM from the SHELL statement from your CONFIG.SYS. The statement forces MS-DOS to load PAM as the primary program you deal with when you use your Vectra. Removing the line causes MS-DOS to load its default command processor, COMMAND.COM. In fact, I suggest you specify additional environment space:

```
DEVICE=C:\COMMAND.COM /E:512  /P
```

This causes MS-DOS to execute AUTOEXEC.BAT once the command processor is loaded. If you want to continue to use PAM, include a line at the end of AUTOEXEC.BAT that executes PAM:

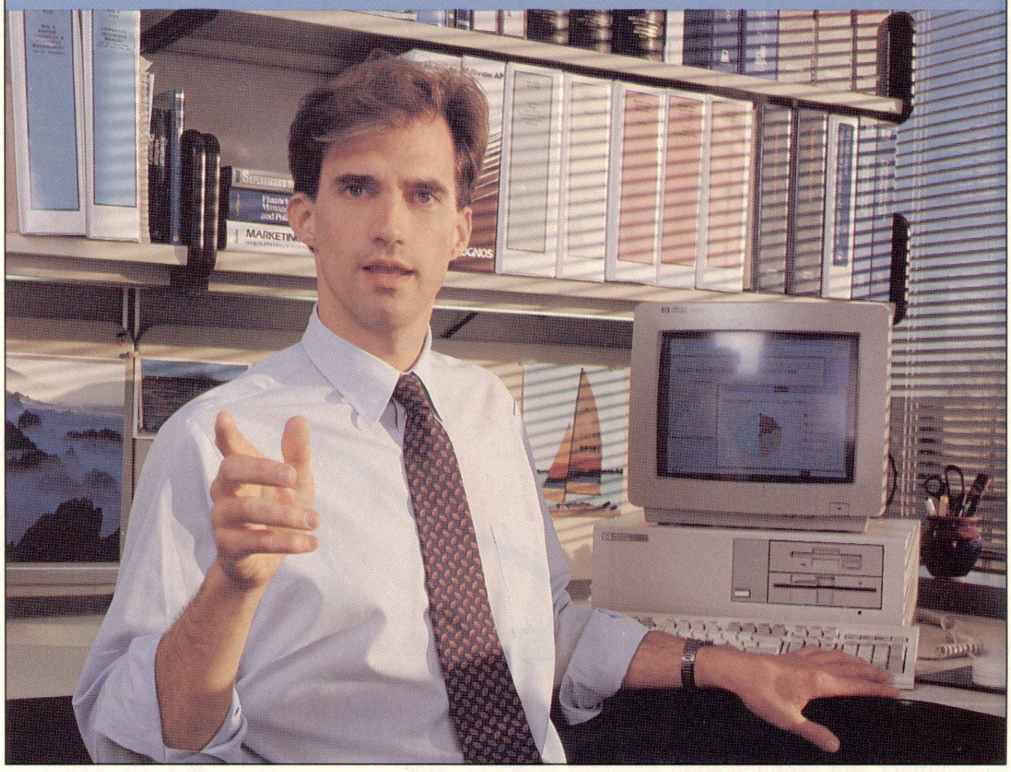
```
PAMCODE
```

This way you'll still see the PAM interface and your system will be more conventional.

Next month, I'll take a look at some of the commands that are in the newer versions of MS-DOS that can help you make better use of your Vectra. — *Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

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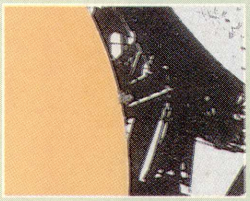
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HP-UX

V/386 Or HP-UX?

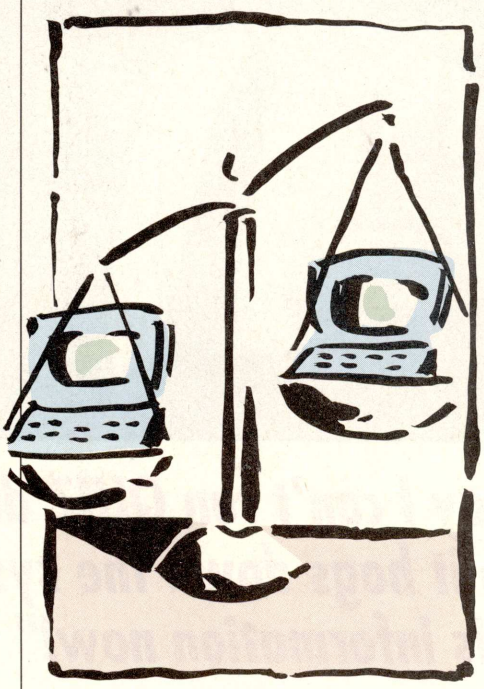
Andy Feibus

Last August, Hewlett-Packard announced an agreement with The Santa Cruz Operation (SCO) under which HP will sell and support the SCO UNIX System V/386 Release 3.2 Operating System (hereafter referred to as V/386) on HP Vectra PCs.

The V/386 Development System is very similar to the HP-UX Programming Environment, except that no documentation utilities (e.g., **nroff**, **tbl**, etc.) are provided. SCCS, HoneyDanBer UUCP, and C development and profiling tools (for both AT&T C and Microsoft **C** 5.0) are all included as part of the development system. Documentation utilities, TCP/IP networking with ARPA/Berkeley networking services, NFS, X Windows (OSF's Motif), and database products can be purchased at extra cost. AT&T Streams is provided with the development system.

The commands and subroutine libraries included with V/386 are conformant with the following standards:

- IEEE 1003.1 Portable Operating System Interface for Computing Environments (POSIX).
- All required Federal Information Processing Standard (FIPS) 151.1 extensions.
- AT&T System V Interface Definition (SVID; conforms to SVVS3).
- AT&T System V/386 binary interface standard.
- The X/Open Common Applications Environment (CAE).
- The Microsoft C compiler conforms to the ANSI X3J11 C Programming Language standard.
- The U.S. Department of Defense standards for a "trusted system" (C2 level of security as defined by the National Computer Security Center).



By following these standards, code developed on a V/386 system should be readily portable to other UNIX systems that conform to the currently "popular" standards.

What Else Is Available With V/386?

A menu- and form-based system administration utility; a mail routing system (MMDF II); multiple login-session capability from the console or any terminal with more than one page of memory; DOS file access utilities; an optional program (VP/ix) to run DOS programs from UNIX; a very sophisticated window-based source-level debugger (Microsoft's CodeView); support for OS/2, DOS, and XENIX cross-development; **lp** support for many common PC printers; and extensive reference and user documentation including a manual to assist in device driver development. V/386 also includes device drivers for many popular PC hardware products.

What Does HP Add To HP-UX That Is Not In V/386?

Real-time programming extensions (**rtprio** and kernel preemption), Korn Shell (**ksh**), RCS, Native-Language Support for languages requiring 16-bit characters, job control from shells (the mechanisms are available to provide job control from programs), long (greater than 14 characters) file names, a debugger that can "grab" a running program and begin debugging from the point at which the program was grabbed, and C Shell command completion (using **ESC**ape or ^D) are a few noticable differences.

However, for all the differences, V/386 is still UNIX. It feels and acts very similar to HP-UX. Moving from V/386 to HP-UX and back shouldn't be noticeable to most UNIX users.

Performance

Although comparing a personal computer to a Series 300 (or 800!) is like comparing apples to Porsches, any discussion of V/386 must include some comments on performance. V/386 requires at least 2 MB of RAM to run (I recommend 4 MB for a two-user development system without X Windows; I recommend at least 8 MB for an X Windows development system or for a larger number of users). Additionally, the development system requires approximately 45 MB of disk space (files and swap space).

Performance on a personal computer is limited by the same issues as performance on any other system: disk speed, RAM speed, backplane bandwidth. Obviously, better performance is derived by faster hardware. With the right combination of hardware, an 80386-based PC

can run just as fast as a 9000/330 (for about half of the price!).

And the 80486-based systems are even better...

Networking To HP-UX

As I mentioned before, TCP/IP, ARPA/Berkeley Services, and NFS are all available as options for V/386. By providing these services, a V/386 system can be connected on the same network (either LAN or WAN) as an HP-UX system and exchange files with the HP-UX system.

Additionally, the V/386 system can execute programs over a network as either a client (the V/386 system requests a program to be run on another computer) or a server (a user on another system requests a program to be run on the V/386 system).

With the X Windows option, which includes HP's 3-D Window Manager, your V/386 system can be made to look and act the same as any HP-UX system on the network and also can execute any program available on the network.

Instead Of HP-UX?

Should you purchase a V/386 system instead of an HP-UX system? If you plan to use your system with only one or two users (or more users, if you do not care about response time; you should be able to have more users on a 80486-based system) using application software packages that are available on V/386, then purchasing a V/386 system may be the least expensive UNIX-based system for you or your company.

However, consider that with HP-UX you can get graphics accelerators (and X Windows drivers to use the accelerators) and real-time program execution.

In the final analysis, your current and future application needs should determine any computer purchase. Right? *Andy Feibus is president of Processware Inc., Atlanta, GA. He has been using V/386 since August 1989 on a 25 MHz 80386-based machine with four MB of RAM and 150-MB (ESDI) disk drive.*

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FIELD SERVICE

Ron Levine

Testing The Network

In today's computer world, chances are that sooner or later you'll have to troubleshoot a data communications problem. This entails "looking at" the interface over which computers, terminals and remote peripherals talk to each other, usually on an RS-232C type of interface. The technician (or sometimes the operator) must determine if a communications problem is located at the source from which the information is transmitted, the channel over which the information travels, or at the receiving hardware.

To monitor and troubleshoot communications paths, the breakout box is a useful tool.

A breakout box monitors the individual pins of a communications interface in order to detect the presence or absence of activity; i.e., it indicates whether a specific pin or line is being used. It helps the user determine if the transmission on a specified pin actually reached its destination.

This capability is ideal for tasks such as cable checking or putting in new installations. Before installing a system, the breakout box can simulate the finished wiring (you can "rewire" the cable by opening leads with the switches and jumpers on the box). This can be done until the wiring format that allows the devices to communicate with each other is found. Then it's only a matter of installing the correct cable match up; the breakout box has done the rest.

There are various types of breakout boxes, from basic models providing barebones monitoring and testing of data transmission over an interface, to sophisticated models with many built-in troubleshooting aids. However, breakout boxes detect only if a line is active. These monitoring tools don't test the active signal for errors, determine if the transmitted data is correctly received nor monitor for garbage on the line. The boxes can't do such tasks as store, send, receive, check or interpret data. Breakout boxes don't test baud rates, check telephone lines nor measure voltages; they simply monitor the individual leads (pins) of a communications interface for activity.

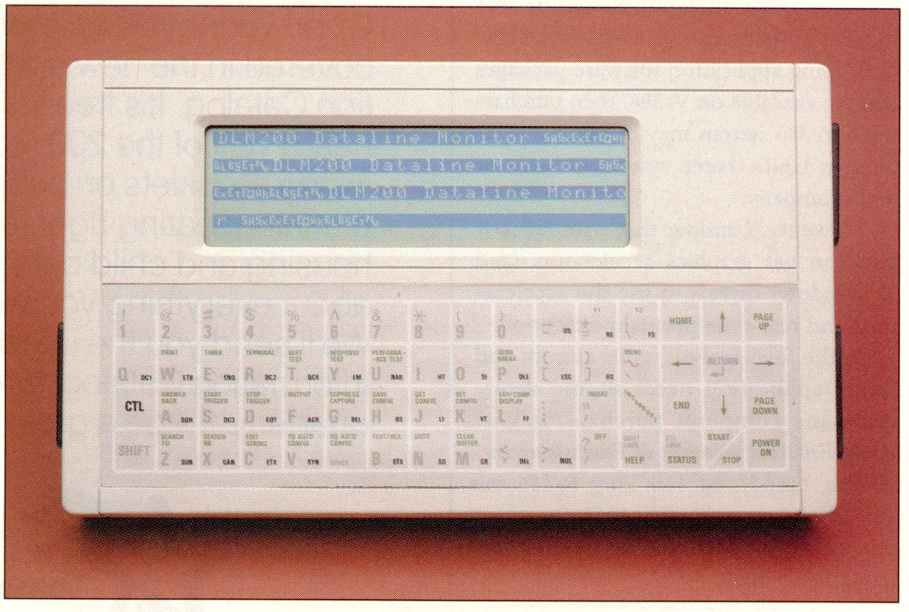
Sometimes the troubleshooting ability of the breakout box isn't enough. When the data itself must be checked for errors, when you need to monitor the communications lines for throughput and garbage, or it becomes necessary to actually capture bytes (to read the data) in their transmitted formats, a data line monitor is necessary.

A data line monitor picks up where a breakout box leaves off. I define it as a sort of logic analyzer for data communications. With it you can observe the flow of transmitted and received data, hold data bytes and store them for future reference, display the data in various formats and perform bit error rate testing (BERT).

Although this type of monitor has been known as a powerful tool for data line monitoring and troubleshooting, its use in the field has been hampered by both price and size. Most full-featured units cost upwards of $5,000, weigh 20 pounds or more and are awkward to handle. These characteristics don't make for a viable field service tool. However, a small, lightweight, hand-held, low-cost unit would be ideal. To our delight, Benedict Computer (Menlo Park, CA) recently introduced a data line monitor of this type (including an optional 10-line breakout box capability) called the DLM 200.

Solving Problems

The DLM 200 is a diagnostic tool to assist in the solving of synchronous or asynchronous data communications



The DLS 200 is a diagnostic tool to assist in the solving of synchronous or asynchronous data communications problems.

The DLM 200 can be used as a monitor, storage device, terminal exerciser, performance measurement device, or response-time monitor...

problems, allowing you to look into your cable for all data transmissions between two RS-232C devices. It's a tool for data line monitoring and testing, for equipment and network configuring and testing, and general data communications troubleshooting.

The DLM 200 weighs only 19 ounces (including the battery) and measures only 9 3/8-inch x 5 1/2-inch x 1 3/8-inch. It's a hand-held device that can be operated from within its protective carrying case. Its long-life nine-volt alkaline battery provides up to 40 hours of power, eliminating the need to locate an AC outlet, and makes the tool suitable for use in out-of-the-way places and in the field.

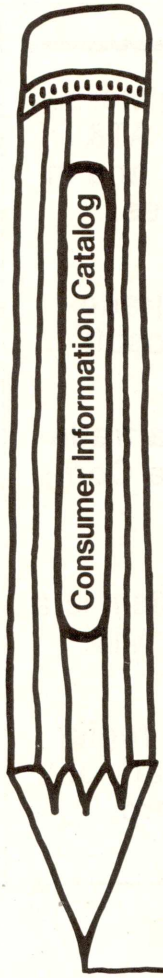
Operational prompts and a menu of configurable parameters are stored in a nonvolatile memory; factory set defaults or the latest user-defined selections are also safely stored for automatic recall. They can be viewed on the unit's LCD, consisting of eight rows of 40 characters each.

The DLM 200's operating panel consists of six soft-touch switches that allow the operator to hold the unit in one hand and operate it with the other. The soft-touch switches are activated individually or in pairs to select modes and to control the 120 functions. Labels on, above and below the switches indicate the operations to be performed. Three operating modes are available: Menu, View and Execute.

The Menu mode provides the screen prompts to guide you through the diagnostic procedure, parameter settings and functions selection. View mode permits data viewing. The data scrolls or pages through the display at one of four selectable viewing rates. An expanded view option makes high-speed data transfers easier to see. The Execute mode is the "do" (activate) mode.

The DLM 200 can be used as a monitor, storage device, terminal exerciser, performance measurement device, or response-time monitor for data communications. As a monitor, it's able to observe the flow of transmitted and received data over sync or async lines.

When storing data, the two buffers, (Transmit Data [TD] and Receive Data [RD]) can hold a total of 32 KB (includ-



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ing modem control signals). Data capture selection can be continuous, discarding the oldest data or stopping when the buffers are full or user-defined (occurring when a 1- to 80-byte character string [trigger] occurs in the monitored data stream). The data can be shown in a choice of several modes and formats, with transmitted and received data simultaneously displayed on consecutive screen rows.

The six modem control signals are Data Set Ready (DS), Data Terminal Ready (DT), Carrier Detect (CD), Ring Indicator (RI), Request-to-Send (RS) and Clear-to-Send (CS). Their state automatically is stored with each byte of TD or RD data, or each time one of the modem control signals changes state.

The DLM 200 is able to transmit 11 data patterns, any of which can be used for continuous output or BERT testing. The test patterns are: contents of either of the unit's two capture buffers, either of the unit's two triggers, 511 BERT pattern, hex FF, hex 00, the entire ASCII character set, fox pattern, fox2 pattern and all bit combinations between 0 and FF (0 to 255 decimal).

The DLM 200 utilizes any of five protocols: async, monosync, bisync, SDLC or isochronous, and can handle baud rates from 75 to 64,000. TD and RD are displayed simultaneously on eight 40-character LCD lines, in ASCII, EBCDIC, IPARs, Baudot or hexadecimal formats.

The unit's LCD prompts, together with the accompanying documentation, is easy to use and understand. With the supplied quick start set-up guide, a novice user can turn on the unit, view and set up parameters, connect the unit to the channel to be monitored and display transmitted and received data within a few minutes.

Additionally, more detailed operational information which covers the full-range of DLM capabilities, plus examples of data communications troubleshooting, is depicted in the user's manual. The organization of the manual and its frequent use of graphics makes the text easy to comprehend.

Benedict Computer
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Menlo Park, CA 94025
CIRCLE 298 ON READER CARD

DLM Operating Features

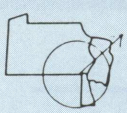
The DLM 200 is a useful data communications diagnostic and troubleshooting tool for applications where something more than a breakout box is needed. It's a versatile piece of test equipment that enables the actual transmitted/received data to be screened along with depicting channel and control signal activity.

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Continued from page 26.

Contact Eyring Inc., 1455 W. 820 North, Provo, UT 84601; (801) 375- 2434.

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INTERTEC Releases Native Mode ESP/3000

INTERTEC Diversified Systems Inc. released Native Mode ESP/3000 for the HP 3000 Series 900.

Native Mode ESP/3000 is a proprietary screen driver designed to provide Series 900 users with performance benefits and advanced capabilities of HP-PA resulting in 20 to 300 percent improvement in screen access time. MAP/3000 program processing time also will be improved.

Contact INTERTEC Diversified Systems Inc., 2625 Park Blvd., Palo Alto, CA 94306; (415) 326-8900.

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Sidon Offers Service Management System

Sidon Data Systems has began delivery and installation of SIMS for the HP 9000.

Sidon provides variations of SIMS to four distinct industries: computer and electronics, office machine and copiers, telephone interconnect and heavy equipment.

SIMS is a business application intended to assist in the management of the service side of an organization or an entire sales and service operation. The major modules are service management with online dispatching, contract maintenance, logistics and inventory control, depot repair, sales and order entry, purchasing and receiving, accounts receivable/payable, fixed assets and general ledger.

Contact Sidon Data Systems, 18001 S. Mitchell, Irvine, CA 92714; (714) 553- 1131.

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Biscom Moves Into Advanced PC Network Environment

Biscom Inc. has made its FAXCOM fax delivery system available on Banyan's VINES networks. Users can send or receive faxes between any PC or workstation on the network and any Group III fax machine worldwide.

FAXCOM gives virtual resource sharing networks an automatic fax transmission and reception capability. FAXCOM for VINES works transparently, dispatching faxes directly from the VINES server without impacting network load. It requires VINES 3.1 or greater, runs on CNS, 386 and 486 Banyan servers, and requires 210K of memory.

Contact Biscom Inc., Forest Ridge Research Park, 85 Rangeway Rd., North Billerica, MA 01862; (508) 670-5521.

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Verity Sets Pace In Text Retrieval Market

Verity Inc. has announced Topic, a text retrieval system to provide the speed, accuracy and ease-of-use required to access unstructured text and image data in today's heterogeneous networked computing environments.

Topic's concept retrieval technology is based on an expert system for text understanding. Its distributed processing architecture is document format, location and network independent ensuring compatibility with existing hardware, software and data.

Contact Verity Inc., 1550 Plymouth, Mountain View, CA 94043-1230; (415) 960-7600.

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Infotek Offers Add-On Memory For Model 332

Infotek Systems, a supplier of enhancement products for HP workstations, has introduced an add-on memory board for HP 9000 Model 332 workstations.

The new memory board, model EM332+4, provides 4 MB of additional memory for HP Model 332 computers, or for HP Model 310s that have been upgraded to Model 332s with HP's 98243C upgrade kit.

The EM332+4 utilizes parity-check error detection and is covered by a five-year warranty. U.S. list price is $2,200.

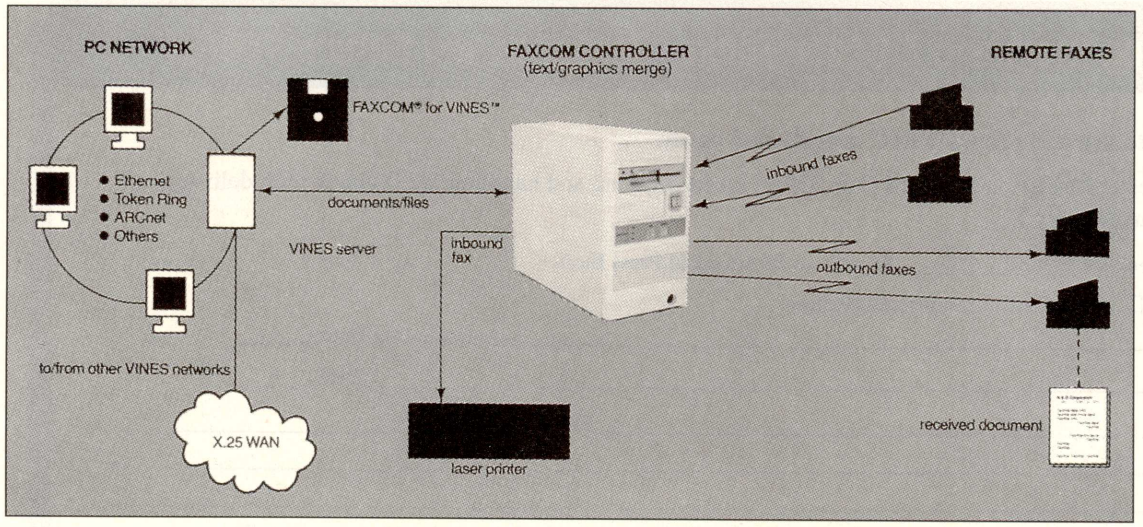
Contact Infotek Systems, 1045 S. East St., Anaheim, CA 92805; (714) 956-9300.

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PCs Communicate Worldwide With PC.25

Comtrol Corp. has announced PC.25 UX, a network solution for business communications, combining multiuser technology with sophisticated data communications protocol, offering high-performance worldwide networking.

PC.25 UX allows PC users to communicate with other PCs, LANs and virtually all minis and mainframes via X.25. The PC can be operated as X.25 DTE/DCE, mul-tiline terminal PAD and host PAD. Communi-cation to any point in the world can be established via regular phone lines or the services of packet switched data networks such as Tymnet, Telenet, DDN and Datapac. PC.25 UX has been certified for use on these networks. System integrators can use the PC.25 UX as a building module for LAN bridges and gateways, protocol



Biscom's FAXCOM is a multistation faxing device for VINES networks.

converters, multiplexers, data line monitors, etc.

PC.25 UX includes XTERM, SCOPY and XBRIDGE. The Smart Hostess and XP Plus are intelligent communication controllers using an Intel 80186 processor and two- or four-dual channel serial communication controllers.

Smart Hostess eight-port with PC.25 communications software retails for $2,490. The XP Plus eight-port with PC.25 communications software retails for $3,040.
Contact Comtrol Corp., 2675 Patton Rd., P.O. Box 64750, St. Paul, MN 55164; (800) 333-1033.

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Duplication Technology Announces CDS-3000

Duplication Technology has announced the availability of CDS-3000, a new cartridge tape duplication system.

The CDS-3000 is available in configurations capable of producing up to 12 copies simultaneously. Copying either the HP 9144 (67 MB) or 9145 (133 MB) tapes, or both, is accomplished in a maximum of 34 minutes.

Prices for the CDS-3000 start at $32,500 and availability is 30 day ARO.
Contact Duplication Technology, 2830 Wilderness Place, Boulder, CO 80301; (303) 444-6157.

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Insight Supports Abode Type Manager

Insight Development has announced that its MacPrint, JetWriter and MacEnvelope device management products now support Adobe Type Manager (ATM) from Adobe Systems Inc. This capability allows Macintosh users to print Adobe PostScript outline fonts, at any size, on low-cost HP and compatible printers.

MacPrint is a device management software package that provides seamless connectivity between Macintosh computers and HP and compatible printers. ATM is a Macintosh system software utility that builds screen fonts from Adobe outline fonts.

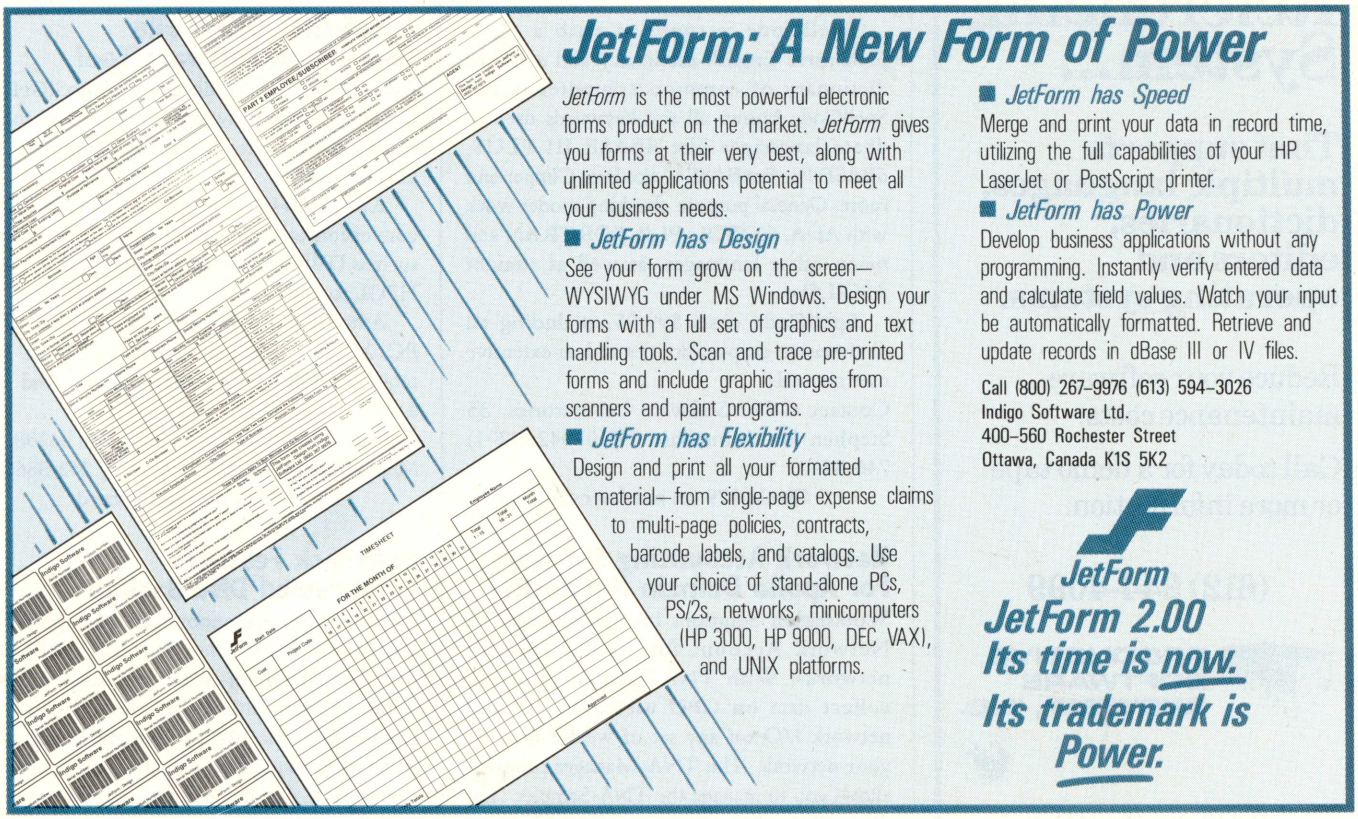
JetWriter is a software and hardware turnkey solution that connects the LaserJet IIP to the Macintosh and enhances overall throughput.

MacEnvelope is an envelope processing system for the Macintosh that provides database and mass mailing capabilities as well as complete control over envelope print appearance.
Contact Insight Development, 2200 Powell St., Ste. 500, Emeryville, CA 94608; (415) 652-4115, or (800) 825-4115.

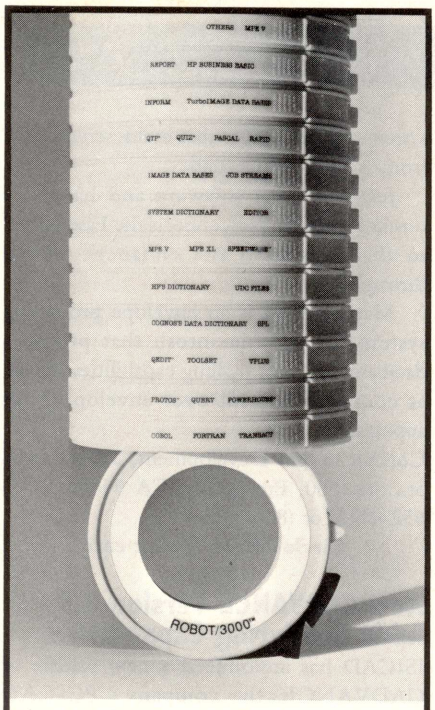
Circle 381 on reader card

New CADVANCE Version 3.5 Adds Rendering Capabilities

ISICAD has announced a new release of CADVANCE, the company's PC-CAD software package. CADVANCE Version 3.5 adds rendering capabilities along with 25 other general feature enhancements, including conformance to newly emerging industry



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Version 3.5 includes enhancements that strengthen CADVANCE's information management capabilities, including its direct, two-way link with dBASE and compatible RDBMS systems.

The new release retains the current pricing: $2,995. Existing customers can upgrade to Version 3.5 for $395. CADVANCE is available for IBM PC/XT, AT and compatible personal computers.
Contact ISICAD Inc., 1920 W. Corporate Way, Anaheim, CA 92803-6122; (714) 533-8910.

Circle 380 on reader card

Geller Software Laboratories Introduces Spell Checker

SpellCode, a spell-checker, is aimed specifically at programmers and database and spreadsheet users.

SpellCode's understanding of programming languages allows it to check only the text displayed to users, or it can check the entire contents of program files. In both modes, SpellCode employs a flexible collection of dictionaries.

SpellCode is supplied with a comprehensive English dictionary and a special dictionary of common computer terms. SpellCode knows all the keywords used in dbase languages like dBASE III PLUS, dBASE IV, FoxBASE+, FoxPro, Clipper and more. General purpose checking modes work with ADA, COBOL, PL/I, FORTRAN and many other languages, as well as straight ASCII files.

SpellCode costs $99.95, including all dictionaries, support utilities and an extensive user manual.
Contact Geller Software Laboratories, 35 Stephen St., Montclair, NJ 07042; (201) 746-8467.

Circle 379 on reader card

Network Accounting Software For Apollo Domain Networks

Workstation Solutions has announced The Network Account for Apollo Domain networks. With TNA-Sampler, you can collect data on CPU use, disc I/O and network I/O on any set of workstations in your network. The TNA-Manager program allows you to manage the TNA-Sampler log files and produce summary reports showing collective CPU use, disc and network I/O.

The Network Accountant includes TNA-Sampler and TNA-Manager for both SR9 and SR10 systems.
Contact Workstation Solutions Inc., 15 Trafalgar Square, Nashua, NH 03063; (603) 880-0080.

Circle 377 on reader card

Collier-Jackson Develops PC Time-Entry Software

Collier-Jackson has developed PC Time Entry as part of its World Class Series Human Resource software for HP's Series 3000 minicomputers.

PC Time Entry enables departments or remote locations to enter time and attendance information. Departmental employee data can be downloaded from Collier-Jackson's payroll software to a local PC as a basis for editing and validation.

PC Time Entry operates on any IBM PC or compatible. Collier-Jackson's payroll software pricing is based on CPU size. PC Time Entry sells for $5,000.
Contact Collier-Jackson, 3707 W. Cherry St., Tampa, FL 33607; (813) 872-9990.

Circle 376 on reader card

AutoSIGHT Offers File Conversion Software Tool

AutoSIGHT Inc. has developed AutoSIGHT Convert, a file-conversion software tool that readily moves files between incompatible CAD systems.

AutoSIGHT Convert provides file conversion to and from popular file formats such as DWG/DXF and HPGL to DXF and HPGL to DWG.

AutoSIGHT Convert works with IBM PC, XT, AT, PS/2 and compatible units. It requires DOS 2.0 or higher, and is priced at $149.
Contact AutoSIGHT Inc., P.O. Box 362086, Melbourne, FL 32936-2086; (407) 242-5865.

Circle 375 on reader card

BackPack Features Compressed Disc Backup

Tymlabs Corp. has announced a compressed disc backup facility, new in Version 2.50 of BackPack, its high-speed and unattended system backup utility for the HP 3000. Compressed disc backup can utilize disc as either an intermediate or permanent storage device. The disc devices used can be system discs or private volumes.

To initiate disc storage, the user specifies DEV=DISC in the file equation for the

STORE or RESTORE device. Each file is treated as a virtual tape reel. Users can implement disc-to-disc backup like that provided by HP's CopyCat, however, BackPack compresses data to minimize dedicated disc requirements.

Contact Tymlabs Corp., 811 Barton Springs Rd., Austin, TX 78704; (512) 478-0611.

Circle 373 on reader card

Clearpoint Upgrades Memory For HP 9000 And 300

Clearpoint Research Corp. has announced 12 MB and 4 MB HP 9000 350/370-compatible parity memory upgrades. The HPME-93P/12MB memory array is user installable onto the existing HP controller card, allowing for a total slot capacity of 16 MB.

Clearpoint memory products are covered by an unconditional lifetime warranty, 24-hour product support toll-free hotline and next-day repair/replacement policy.

Prices for the HPME-93P/12 and HPME-93P/4 are $6,500 and $2,500 respectively.

Contact Clearpoint Research Corp., 35 Parkwood Dr., Hopkinton, MA 01748; (508) 435-2000.

Circle 374 on reader card

OCS Boosts Software Line-Up With ROBOT/3000

OCS has announced an agreement with Productive Software Systems to market its ROBOT/3000 product.

OCS/ROBOT maintains a cross-reference database of elements, files and tables used in source code libraries and job control files. It allows users to determine the magnitude of proposed program changes before they're implemented. An online inquiry function provides access to the complete cross reference of all affected source programs, form files, job streams and UDCs.

Contact OCS, 560 San Antonio Rd., Palo Alto, CA 94306; (415) 493-4122.

Circle 370 on reader card

Valid Enhances Analog Design System

Valid Logic Systems Inc. has announced an enhanced version of the Analog Workbench. Release 2.3 provides designers with advanced analog circuit analysis capabilities, increased flexibility during simulation runs and an additional 350 analog device models of standard, complex analog components.

New to Release 2.3 of the Analog

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Workbench is the pole zero analysis capability, used in conjunction with the company's Spice Plus simulator. This is well suited to analog system designs containing feedback circuits such as filters, control systems and power supplies, which are particularly sensitive to signal frequencies.
Contact Valid Logic Systems Inc., 2820 Orchard Pky., San Jose, CA 95134; (408) 432-9400.

Circle 372 on reader card

Visible Analyst Workbench Incorporates Structured Design

Visible Systems Corp. has announced an advanced version of its CASE tool, the Visible Analyst Workbench. Version 3.1 extends the application into the design phase of software development by supporting the Constantine method of structured design.

Version 3.1 provides a powerful CASE tool for the integrated creation of both structured analysis and structured design system models using a common project-based repository. Other enhancements include higher operating speeds, support for expanded memory and high-resolution graphics.
Contact Visible Systems Corp., The Bay Colony Corporate Center, 950 Winter St., Waltham, MA 02154; (617) 890-CASE.

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MiniSoft ToolKit Available For HP 3000, 9000

The MiniSoft ToolKit is a programmatic interface that allows application and system programmers to incorporate a comprehensive set of word processing features directly into their applications. Features that can be integrated include creating, editing displaying, printing and copying documents to MiniWord; copying from MiniWord, converting documents to and from ASCII files, and merging documents with data.

The ToolKit is accessible from all major programming languages including COBOL, C, PASCAL, FORTRAN, SPL, TRANSACT, PowerHouse and SpeedWare.

Prices for the MiniSoft ToolKit start at $1,000.

Contact MiniSoft Inc., 16315 N.E. 87th, Ste. B101, Redmond, WA 98052; (206) 883-1353 and (800) 682-0200.

Circle 369 on reader card

Pacific Data Offers Memory Board For LaserJet IIP

Pacific Data Products Inc. has announced the 2 Plus 2, upgradeable memory expansion board for the HP LaserJet IIP printer.

The 2 Plus 2 users can expand their printer memory as their printing needs increase by plugging in additional memory chips. The 2 Plus 2 can be configured with 1 or 2 MB of memory. Users can easily add a second board if 3 or 4 MB are needed.

The 2 Plus 2 memory board is easy to install and fully compatible with the HP IIP memory board.

Prices for 2 Plus 2 range from $295 for 0 MB to $595 for 2 MB.
Contact Pacific Data Products, 6404 Nancy Ridge Dr., San Diego, CA 92121; (619) 552-0880.

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Publisher Software Bundling From Qume

Software that allows PC users to take advantage of PostScript capabilities is offered free with the purchase of CrystalPrint Publisher, a PostScript language-compatible printer from Qume Corp. The free software is Trading Post, a product of LaserTools Corp.

Trading Post's configure utility enables users of nonPostScript software to select any point size for CrystalPrint Publisher's 39 resident fonts or any PostScript compatible downloadable font. CrystalPrint Publisher's newest features include single-sheet feed and manual envelope feed printing capabilities.

CrystalPrint Publisher sells for $4,449. Contact Qume Corporation, 500 Yosemite Dr., Milpitas, CA 95035; (408) 942-4000.

Circle 372 on reader card

FOR YOUR INFORMATION

■ Neuron Data Services Inc. has entered into an agreement with Brant Computer Services Limited, combining business interests to establish a full-service Computer Technology Company with a distinct division specifically geared to support the system requirements of the printing industry. Brant will market PMIS (Printing Management Information Systems) throughout Canada and will provide service and support to all users. (416) 238-9790.

■ Brevard Technology Plus Inc., an information technology company that specializes in providing productivity-enhancing software products and services to business and industry, has changed its name to AutoSIGHT Inc.

■ M&T Books has announced the availability of *Blueprint of a LAN*, by Craig Chaiken. It's a 350-page hands-on guide to discovering and experimenting with a microcomputer network. The company also announced *NetWare Supervisor's Guide*, a companion to *NetWare User's Guide*. It offers a brief history of NetWare and its family of products and examines in detail each of the components of the operating system. (415) 366-3600.

■ Peachpit Press has announced *ScanJet Unlimited*, a 350-page book explaining the art and science of scanning using the HP ScanJet Plus scanner. It is priced at $24.95. (800) 283-9444.

■ Spectral Dynamics now has available for free its new *Vibration Handbook 1990*. It contains information about the company and its products, along with basic vibration reference data and charts, applications information and a glossary of vibration analysis terms. (619) 496-3400.

■ Advanced Computing Environments, the sponsor of INTEROP, announces an all new 1990 tutorial program featuring more topics, more instructors and more locations in the U.S. and now London. (415) 941-3399.

***Note:** For more information about HP products mentioned in **New Products**, contact the Hewlett-Packard sales office listed in the white pages of your telephone directory.*

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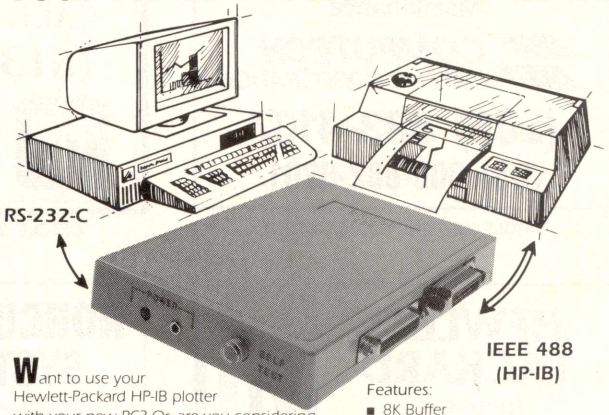
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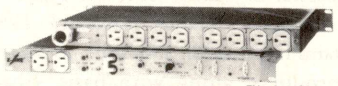
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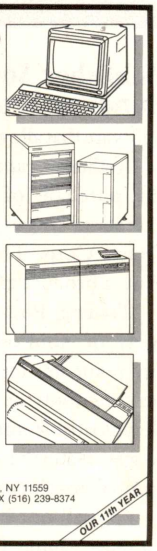
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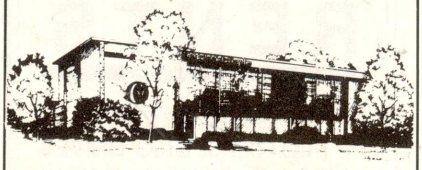
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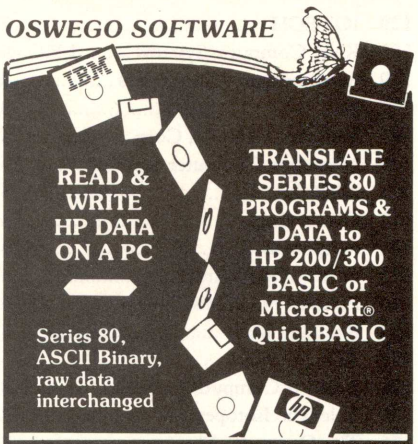
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[CALENDAR]

[MARCH]

19-22: The National Computer Graphics Association (NCGA) is holding a conference and exposition at the Anaheim Convention Center, Anaheim CA. Call Michael Weiner (703) 698-9600.

27-29: DB/Expo '90, The National Exposition and Conference is taking place at the Moscone Convention Center San Francisco, CA. Contact Dana De Nardi (415) 941-8440.

[APRIL]

1-4: The Development Center Institute is holding its 1990 Spring International Development Center conference in Orlando, FL at the Orlando Marriott Hotel. Call (317) 846-2753 for more information.

2-4: Patricia Seybold's Office Computing Group is holding a forum, "Distributed Network Computing and Object-Oriented Environments: Pillars for the 1990s." Call (800) 826-2424.

8-10: BWRUG is holding it's Fourth Atlantic Conference at Rosslyn Westpark Hotel, Arlington, VA. Registration fee $175. Call (301) 242- 6777.

8-11: The annual JOBSCOPE User's Conference is being held at the Stouffer Orlando Resort, Orlando, FL. Call (800) 443-5794 or, from S. Carolina, (803) 233-1853.

[MAY]

2-4: Southern California Regional Users Group (SCRUG) is holding its 13th annual technical conference and trade show for HP 3000 computer users at the Pasadena Conference Center, Pasadena, CA. For more information contact Betty Vaughan, (213) 450-3383.

22-24: Patricia Seybold's Office Computing Group presents "The Applications Development Environment of the 1990s: Can UNIX Set The Innovation Agenda?" Call (800) 826-2424.

28-6/1: The 11th Annual Eastern American Hewlett-Packard Users Conference is scheduled for the Bally's Plaza Hotel and Casino, Atlantic City, NJ. Call (215) 875-5324.

[JUNE]

19-20: MTLRUG is holding its quarterly meeting at the Dorval Airport Hilton, Canada. Call Mich Kabay (514) 931- 8167.

[AUGUST]

20-23: 1990 INTEREX HP Users Conference will be held at the John B. Hynes Veterans Memorial Convention Center, Boston, MA. For more information call (408) 738-4848.

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